

# TOLERANCE FOR AMBIGUITY, CREATIVITY, AND PERSONALITY

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Ambiguity tolerance describes individual behaviour in ambiguous situations where one has to act with lack of clarity or lack of information. This workshop will discuss individual differences in tolerance – intolerance of ambiguity, their measurement, and their relation to creativity and personality. Empirical results that were obtained in Bulgaria in 14 concurrent, cross-sectional, cross-cultural, correlational and experimental studies with adolescents and adults will be brought together with findings reported elsewhere in order to outline the role ambiguity tolerance plays in individuals' behaviour and development (Stoycheva, 1998; 2003; 2005; 2008). Our work will be organised in three parts. The first part will explore the notion of ambiguity tolerance and its application to the study of human development and individual and group behavioural outcomes in different areas of life. The second part will discuss the relation of ambiguity tolerance to other personality traits and processes in a way that differentiates between individual premises for tolerance - intolerance of ambiguity and its consequences for personality and individual behaviour. The third part will examine the place of ambiguity tolerance in creativity research, and empirical data on the relation of ambiguity tolerance to creative motivation and creative performance will be presented and analysed.

**Keywords:** tolerance – intolerance of ambiguity; personality traits; creative motivation; creative thinking and problem solving; individual differences' measurement

## THE NOTION OF AMBIGUITY TOLERANCE

Psychological science uses the notion of *ambiguity tolerance (AT)* to describe individual behaviour in ambiguous situations (Stoycheva, 2003a). Ambiguity occurs in a wide range of settings: at work and at home, in everyday life situations, in interpersonal communication and in our interactions with social groups and institutions. Communication may be ambiguous due to multiple meanings of chosen words or inconsistency between verbal and non-verbal parts of a discourse. Imprecise concepts, missing information, unclear performance criteria and probabilistic decision-making situations challenge us in solving problems. There may be also social role ambiguity due to contradictory, or fragmented interpersonal relationships. People face emotional ambivalence, cognitive incongruity and uncertain outcomes or meet with novel or uncommon situations where the true and tried ways of doing do not work. Ambiguity refers to a lack of clarity due to either a lack of information or a lack of coherence in the available information that may come from stimuli that are vague, incomplete, fragmented or from contradictory, inconsistent, incongruent stimuli that cannot be clearly defined or understood.

How people experience an ambiguous situation and what they do in such a situation is indicative of their tolerance - intolerance of ambiguity. The term "tolerance" refers to an attitude of acceptance as it is, for example, in drug tolerance or political tolerance. Tolerance with regard to ambiguity indicates, in particular, a capacity to "live with" ambiguity, endure ambiguity, to operate with and within ambiguity; it does not imply liking ambiguity or searching for it, although this may be the case for some tolerant people. Tolerance is usually contrasted with intolerance of ambiguity on the continuum of individual differences in ambiguity tolerance, denoting how well people cope with ambiguous situations from avoidance to acceptance to deal with.

An adult for example may not perceive the double meaning in a sentence he hears on a foreign language, due to his/her lack of knowledge of this language. In such a case ambiguity tolerance is irrelevant to subject's reactions to the situation. Objective ambiguity needs to be subjectively experienced in order to impact one's behaviour in this particular situation. On the other hand, perception of ambiguity and ambiguity per se are not necessarily threatening (see Stoycheva, 2003a, for details). It is the need to act upon ambiguous stimuli or situations that challenges the individual to cope with ambiguity in his or her behaviour, to decide upon its meaning and react to it in one or another way.

### **TOLERANCE – INTOLERANCE OF AMBIGUITY**

Individual differences in ambiguity tolerance manifest themselves in the content and the form of the representations that individuals create in ambiguous situations, in the direction of the actions they undertake, and in the accompanying affect. They are also related to the intensity and variability of individual's actions and reactions to ambiguity: weak to moderate reactions to ambiguity coupled with a large variability of resulting actions characterize tolerant individuals, whereas intense reactions and small variability of responses characterize intolerant individuals.

People who are *intolerant of ambiguity* perceive and interpret ambiguous situations as a source of psychological discomfort or a threat, seem confused by ambiguity and tend to avoid it, either psychologically or operationally by leaving the situation. When faced with ambiguity, they experience intense negative affects like anxiety and stress. Their reactions are defensive, disorganised and accommodation to the situation is blocked. Intolerant people are likely to arrive at "black-and-white" judgements, to reduce their view of the situation to certain, simple and familiar cues, and defend themselves through rigid, stereotyped behaviours which lead them to less than optimal solutions to the problem. By subsuming it under well-known, familiar and clear, i.e. non-ambiguous, situations, which entail well-articulated action patterns, ambiguity about how to behave and what to do is finally avoided.

People who are *tolerant of ambiguity* are better able to tolerate the feelings of anxiety and uncertainty induced by ambiguity. Their affective reactions are less intense and more varied. They will perceive and interpret an ambiguous situation more adequately, in a realistic way, without denying or distorting parts of its complexity. Tolerant people are likely to elaborate more adaptive and better co-ordinated behaviour. Those who are tolerant of ambiguity are better able to meet the challenge: they can withstand the discomfort of an ambiguous situation long enough as to accommodate and generate more appropriate and flexible responses to it. At the tolerance pole, an individual will dialectically interact with the situation, balancing the processes of tension reduction and information seeking.

In a cross cultural study judges (French and Bulgarian doctoral students in psychology) rated personality traits, attitudes and behaviours with respect to their relatedness to the AT construct. Of the 46 items at the strongest level of relatedness to AT, 42 describe manifestations of intolerance of ambiguity and only 4 describe manifestations of tolerance of ambiguity. Ambiguity tolerance was related to experiencing discomfort and frustration with the lack of clarity in ambiguous situations or the unpredictability of events and people's behaviour; to an inability to act in ambiguous situations; the avoidance of ambiguity in one's understanding of a situation, event or idea, and the avoidance of the encounter with ambiguity, but also to a positive experience of enjoyment in uncertain or ambiguous situations, and a preference for exploration (Stoycheva, Lubart, Zenasni, Popova, 2008).

The relationship between ambiguity tolerance and the subjective experience of uncertainty was further examined in an empirical study, carried out by Valentina Lessenska. The participants - 127 high school students, university students and adults, filled in the Bulgarian adaptation of Norton's AT scale and Intolerance of Uncertainty Scale (Freeston,

Rheume, Letarte, Dugas, & Ladouceur, 1994) respectively. Negative relation between tolerance for ambiguity and intolerance of uncertainty was observed ( $r = -0,63$ ;  $p < 0,01$ ).

### **AMBIGUITY TOLERANCE AND PERSONALITY**

Empirical findings suggest that cognitive, affective and behavioural traits influence individual's tolerance - intolerance of ambiguity. Differences in intelligence, creative thinking, cognitive style, anxiety, dogmatism and rigidity appear to shape individual reactions to ambiguous situations. On the other hand, individual differences in ambiguity tolerance influence one's beliefs, social attitudes, values, motivation and behaviour. Through their relations to social objects, groups, ideas and activities individuals tend to avoid or accept different ambiguous situations (see Stoycheva, 2003a, for details).

Tolerance of ambiguity is based, in part, on cognitive abilities and knowledge. Empirical data support this proposition, for example, showing positive relation between tolerance for ambiguity and subjects' educational level. A cross sectional study of 392 high school students, 472 university students, and 116 18 - 25 year old working adolescents, who were administered the Bulgarian adaptation of Norton's AT scale showed that university students had higher tolerance of ambiguity than their age mates who were not enrolled in a university. This finding was corroborated in a study that compared 60 university students and non-university youth ( $n=53$ ) (Glutnikova, 2000) In particular, the low AT scores of the non-university women were contributing to the observed difference.

Similarly, adults' higher educational level is associated with higher tolerance for ambiguity across the life span. Subjects with university education scored higher than subjects with up to secondary education in two samples. A sample of 305 adults aged 18 to 69, balanced by gender and educational level filled in the Bulgarian adaptation of MacDonald's AT scale (Stoycheva, 2003a), and a sample of 116 adults was tested with the Bulgarian adaptation of Norton's AT scale (Komneva, 1999)

In another study two groups of high-school students were contrasted. Low AT students ( $n = 51$ ) and high AT students ( $n = 55$ ), scoring below or above one standard deviation from the mean score for the high school sample, were compared with respect to their intelligence, creative thinking abilities, personality traits, anxiety, need for achievement and self-concept. The High AT group scored higher on intelligence than the Low AT group, mainly due to the higher number of low intelligent subjects in the Low AT group (Stoycheva, 1998; 2003a).

High AT adolescents also scored lower on trait anxiety and showed a more positive self-concept (Stoycheva, 1998; 2003a). They appeared more self-confident with respect to their coping self (feelings of mastery and well-functioning, idealistic concerns and orientation towards humanistic values), while Low AT adolescents show poorer adjustment in this area of functioning. Furthermore, ambiguity tolerance moderated the negative relation between anxiety and adolescent self-image (Stoycheva, Silguidjian, 2001). The relation between tolerance for ambiguity and self-confidence appeared as well in a study of the self-determination in university students (Lessenska, 2002). AT scores correlated negatively with scores on a measure of impersonal causality orientation: intolerant of ambiguity individuals tended to feel more ineffective, unable to affect desired outcomes or cope with demands or change (Lessenska, 2002).

On the other hand, tolerance for ambiguity in adults was related to a preference for occupations that are characterised by high degree of ambiguity and high degree of freedom. The study involving 35 men and 87 women aged 18 to 62 investigated the relations between ambiguity tolerance, professional preferences and professional choice in adults (Komneva, 1999). In a similar vein, a study of high school students' attitudes towards geographic mobility showed that high AT adolescents were more willing to relocate when offered incentives (e.g., promotion) (Dette, Dalbert, 2005). Ambiguity tolerance related to the type of

university education as well: students in arts outscored those in medical and technical studies (Stoycheva, 1998; 2003a).

### **MEASUREMENT OF AMBIGUITY TOLERANCE**

The study of ambiguity tolerance has its roots in the research on the authoritarian personality after the World War II. It is the work of Else Frenkel - Brunswik (1948) that stimulated in particular the investigation of tolerance - intolerance of ambiguity. Subsequent research analysed the relation of ambiguity tolerance to other personality traits and processes, to human development in the life span and to individual and group behavioural outcomes in different areas of life. Researchers in decision making, organisational development, technology and innovation, education and training, career and vocation, mental health, psychological counselling and psychotherapy have also included the dimension of tolerance - intolerance of ambiguity in their studies. Publications in ambiguity tolerance come from more than 200 different journals in psychology and related fields.

Ambiguity tolerance has been measured in a variety of ways. Several paper-and-pencil self-report questionnaires and scales were developed, the most popular among them being those proposed by Budner (1962), MacDonald (1970), Norton (1975), and McLain (1993). Experimental tasks and activities that measure individual's reactions to ambiguous stimuli (see, for example, Frenkel-Brunswick, 1948), scales and sub scales from already existing personality questionnaires, and psychological methods like TAT or Rorschach were also used, as well as expert evaluation of children' and students' behaviour by parents, teachers or clinical psychologists (see Furnham, Ribchester, 1995, and Stoycheva, 2003a, for reviews).

There has been a debate over the construct validity of several of these measures, the comparability of data obtained through different methods remain controversial and their rather low intercorrelations raised questions about the validity of the construct itself (Furnham, 1994; Furnham, Ribchester, 1995; Stoycheva, 2003a). To this on-going debate on the validity of the AT measures, our research has contributed a new perspective on the content validity of the self-report measures and a comprehensive classification of the experimental measures of tolerance-intolerance of ambiguity. AT questionnaires, for example, differ with respect of the items they employ. There are items that describe a behaviour (*I always want to know in advance who will be at the party*) that is indicative of tolerance - intolerance of ambiguity. There are also items that tap beliefs (*Women are either bad or good*) or personality traits (*I don't like changing my routine*) that are related to individual differences in ambiguity tolerance. Items' disparity seems responsible, at least partially, for the disparity of results. AT measures that are composed mostly of behavioural items, i.e. self-reports of frequency and intensity of one's reactions of tolerance - intolerance across variety of ambiguous situations, show higher reliability and greater consistency (Stoycheva, 2003a).

### **TOLERANCE – INTOLERANCE OF AMBIGUITIY: PERCEIVED IMPORTANCE AND ENCOURAGEMENT**

One of the most powerful ways in which a culture encourages or discourages certain behaviour is the way by which teachers and parents reward or punish certain personality characteristics as they develop in children and the behaviours which manifest those characteristics. A concurrent study of high school students, their parents and teachers examined the development of ambiguity tolerance in adolescents in relation to adults' encouragement for tolerance - intolerance of ambiguity on the one hand, and adolescents' perception of adults' encouragement on the other. The study involved 303 high school students aged 14 to 19 from two high schools, one in the capital city and one and in a small town, their teachers (n = 52) and parents (n= 236) (Stoycheva, 1998; 2003a)

An original psychological instrument has been designed to assess the attitudes of adolescents and adults towards the ambiguity tolerant and ambiguity intolerant behaviours. A

list of 30 behaviours indicative of tolerance for ambiguity (TA) and 30 behaviours indicative for intolerance of ambiguity (InTA) was compiled from the research literature. The 60 items were given to 30 professional psychologists and 34 graduate students in psychology who served as experts in the evaluation of the content validity of the items. Out of the initial 60 items, 23 TA and 11 InTA items were correctly identified by at least 80% of the experts. The remaining 34 items were then evaluated for social desirability by 30 teachers and 48 parents. From the 34 items, an equal number of TA and InTA behaviours were selected. Thus the scale for measuring attitudes towards tolerance – intolerance of ambiguity consists of 7 TA and 7 InTA behaviours that are thematically related and have a similar moderate degree of social desirability.

The scale was used to measure the importance that adolescents assign to these behaviours and to evaluate adults' encouragement of ambiguity tolerance - intolerance in adolescents. Parents and teachers were given the scale with the instruction to indicate how often they encourage these behaviours within their family or with their pupils on a 4 point Likert type scale from “almost always encourage” to “almost never encourage”. Students were asked to indicate, on a 4-point rating scale, 1) how important these behaviours are for themselves and 2) how often their teachers encourage these behaviours, and 3) how often their parents encourage these behaviours. This scale was further used with young adults in a retrospective study of their parents' encouragement of ambiguity tolerant - intolerant behaviours (Glutnikova, 2000) and with a sample of 118 French adolescents aged 12 to 19 and their parents (cf. Stoycheva, 2003a).

Empirical data gathered throughout the construction of the scale and its subsequent application in studies of ambiguity tolerance in adolescents and young adults indicate that both ambiguity tolerant and ambiguity intolerant behaviours are valued by adolescents and positively perceived and encouraged by their teachers and parents. Results also suggest that attitudes towards ambiguity tolerant and ambiguity intolerant behaviours, although related, reveal different psychological constructs (Stoycheva, 2003a; 2005).

Thus, for example, TA behaviours were more easily recognised and were rated as more socially desirable by both groups of experts. Parents, however, rated InTA behaviours as more desirable and also reported encouraging them more often compared to teachers who both consider TA behaviours more desirable and encourage them more. Preferences for InTA behaviours (but not for TA behaviours) depended upon demographic factors like age, education and settlement: younger adolescents, parents with secondary education and those living in a small town valued and encouraged InTA behaviours to a greater extent.

On the other hand, the differentiation of the relation of AT scores to the importance assigned to TA and InTA behaviours points to a differentiation in the psychological mechanisms behind individuals' differences in ambiguity tolerance. Adolescents preferred TA to InTA behaviours, and their preferences were inversely related. Adolescents' tolerance for ambiguity however was inversely related to the importance they assigned to InTA behaviours and was not related to their preference for TA behaviours. This finding was replicated with French adolescents as well. We also found that ambiguity tolerant adolescents perceived their parents as less encouraging InTA behaviours while adolescents' AT scores were unrelated to perceived parental encouragement for TA behaviours. The same pattern of relations was observed in the retrospective study of young adults (Glutnikova, 2000).

## **AMBIGUITY TOLERANCE AND CREATIVITY**

Theories of creativity emphasise the importance of ambiguity tolerance for the production of new, original and appropriate solution to a problem, whether it is an object, a theory or a personal or social act embedded in a particular human interaction. Empirical

studies of the relation of tolerance for ambiguity to creativity are rare, however (see Stoycheva, 2003b,c).

Our research suggests that tolerance for ambiguity contribute to idea generation in the creative problem solving (Stoycheva, 2003c). High AT adolescents outperformed those who were low in AT on both verbal and non-verbal tasks from the Torrance tests of creative thinking (Stoycheva, 1998; 2003a). Ambiguity tolerant students were able to generate more original and unusual ideas and solutions to open-ended verbal tasks. They also provided more inventive, imaginative and abstract titles to their pictures - titles that go beyond what can be seen. Also, in a study of 34 pairs of French adolescents and their parents, tolerant for ambiguity participants generated more unique solutions to a verbal divergent thinking task (Zenasni, Besançon, Lubart, 2008).

In an experimental study of the impact of problem redefinition on the generation of creative solutions to the problems, two groups of students in business administration were asked to generate original and effective solutions to real-life problems. Four professional psychologists rated their problem redefinitions for breadth and generalisation while four experienced managers rated the creativity of the proposed solutions to the problems. Individual differences in tolerance of ambiguity were related to problem redefinition and creativity: a) students who were high in tolerance of ambiguity have provided problem redefinitions that were judged as more broad and generalised, and b) the mean creativity score of their solutions to the redefined problem was higher than the mean creativity score of their solutions to the non-redefined problem.(Stoycheva, Popova, Komneva, 2007).

Ambiguity tolerance is also important for decision making in creativity (Stoycheva, Lubart, 2001). Decision making is required at crucial moments in the process of generation, evaluation, selection and implementation of solutions. These are, for example, when to evaluate ideas, how to judge their originality and relevance, whether to persist or leave a stubborn problem, where to look for new possibilities, is the creative product ready to be accepted by the public. Tolerance for ambiguity seems to help restructuring the problem space and generating creative options to choose from.

An important element of individual's creativity is motivation. Motivation regulates the investment of time and efforts in problem solving, puts into action cognitive and personality resources, contributes to the development of domain-relevant creative skills and supports life-long creative performance. Research on ambiguity tolerance and motivation for creativity (Stoycheva, 1998; 2003a,c; 2008) allows specifying the motivational role of ambiguity tolerance in creativity. It has been found that 1) creative motivation and need for achievement are positively correlated; 2) ambiguity tolerance correlates positively with creative motivation, and 3) ambiguity tolerance doesn't correlate with need for achievement. The positive association between tolerance for ambiguity and creative motivation was replicated across two samples of 106 high school students and 135 university students, tested with the Bulgarian adaptation of Norton's AT scale (Stoycheva, 2008), and two samples of 117 university students and 279 adults, who filled in the Bulgarian adaptation of the MacDonald's AT scale (Stoycheva, 2003a,c). Creative motivation scores were derived from the Bulgarian adaptation of Torrance's Creative motivation scale (Stoycheva, Stetinski, Popova, 2008).

The ability to withstand the discomfort of an ambiguous situation and to cope with induced uncertainty contributes to one's willingness to embark on the exploration of new possibilities, unusual ideas, and uncommon pathways. This proposition is further supported, for example, by the empirically found positive association between tolerance for ambiguity and openness to experience (Zenasni, Lubart, 2001) and tolerance for ambiguity and self-evaluation of creative personality traits (Zenasni, Besançon, Lubart, 2008).

Thus tolerance of ambiguity empowers the intrinsically motivated exploration of novel, unusual or complex stimuli and situations. In this way ambiguity tolerance contributes

to the creative process. However, ambiguity tolerance is not related to the search for high standards of achievement in the results of the creative work (Stoycheva, 1998; 2003a,c; 2008)

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