

## PRE-SERVICE TEACHERS' AMBIGUITY TOLERANCE

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**Abstract.** *Teachers encounter many ambiguous situations in their every-day practice. They have to deal with pupils with various disabilities, personality and background diversity. The aim of this study is to examine pre-service teachers' ambiguity tolerance and perceived knowledge and skills for work with various types of diversity in the classroom. Pre-service teachers (N = 176) self-assessed their knowledge and teaching skills for 20 different types of children with special educational and social needs. The Multiple Stimulus Types Ambiguity Tolerance Scale-II was used to assess their ambiguity tolerance. Pre-service teachers' ambiguity tolerance appeared to be moderate. There was no significant difference across years of study and only weak or slight relationship between ambiguity tolerance and self-reported inclusive competences.*

**Keywords:** *ambiguity tolerance, competence, diversity, pre-service teachers, specific educational needs*

### Introduction

School classrooms are becoming more diverse social settings. Teachers have to deal with pupils with various disabilities, personality and background diversity, which may lead to special educational needs or barriers in both educational and social inclusion. It seems to be difficult especially for novice teachers to cope with classroom diversity as they may hold stereotypes and lack knowledge and teaching experiences. These stereotypes are based on personal experiences and might be also influenced by personality traits and cognitive styles. One of the cognitive styles often related to stereotyping is the ambiguity tolerance.

This study aims to analyse the level of ambiguity tolerance among Slovak pre-service teachers. Based on the results of previous research three research questions were posed:

1. Are there any gender differences in the level of ambiguity tolerance among pre-service teachers?
2. Are there any differences in the level of ambiguity tolerance across academic years among pre-service teachers?

3. Is ambiguity tolerance linked to pre-service teachers' self-evaluation of inclusive competences?

### **Theoretical background**

Ambiguity tolerance is characterized as the way individuals perceive and respond to ambiguous, unfamiliar or inconsistent situations or stimuli (Arquero & McLain, 2010). In such a situation, ambiguity could limit decision making and prediction (McLain, 2009). Intolerance of ambiguity is then an aversion to lack of information, while ambiguity tolerance represents acceptance of, or even attraction to, ambiguous situations (Arquero, Fernández-Polvillo, Hassall, & Joyce, 2017). People with low ambiguity tolerance tend to experience anxiety, stress, and discomfort when confronted with ambiguous stimuli. On the other hand, individuals with high ambiguity tolerance evaluate uncertain and ambiguous stimuli as desirable and interesting (Xu & Tracey, 2014).

Ambiguity tolerance versus intolerance is often defined as a cognitive style (Stoycheva, 2010; Lojová & Vlčková, 2011; Fontana, 2014), as such ambiguity tolerance is related to other variables like lower need for structure (de Roma, Martin, & Kessler, 2003), higher flexibility, risk taking (Tymula et al., 2012), lower anxiety (de Roma, Martin, & Kessler, 2003), or creativity (Stoycheva, 2010). The level of ambiguity tolerance affects an individual's decision making in a situation when information is incomplete, inaccessible or ambiguous. When facing an uncertain situation, less ambiguity tolerant individuals tend to behave in a way that reduces uncertainty, including categorizing, labelling or stereotyping (Valutis, 2015). They tend to respond more stereotypically especially in challenging or stressful situations (Friedland, Keinan, & Tytun, 1999).

As a cognitive style, ambiguity tolerance may influence learning routines and preferences. Students with higher levels of ambiguity tolerance tolerate better unstructured elements of a course that promotes critical thinking (de Roma, Martin, & Kessler, 2003). They tend to select more effective learning strategies (Zhang, 2004), and to achieve a higher level of education (Stoycheva, 2010). In the educational context, ambiguity tolerance has been the most widely studied in the field of second/foreign language learning as a predictor of higher proficiency (e.g., Dewaele & Li, 2013; Lojová & Vlčková, 2011; Zhang, 2004; Liu, 2015).

Adults with a higher level of ambiguity tolerance preferred occupations with a higher degree of ambiguity and freedom (Stoycheva, 2010). Ambiguity tolerance has been studied also as a professional personality characteristics, mainly among managers, entrepreneurs or accountants (Xu & Tracey, 2014; Arquero, Fernández-Polvillo, Hassall, & Joyce, 2017), medical doctors (Yee, Liu, & Grobman, 2014; Kuhn, Goldberg, & Compton, 2009), health care and social workers (Valutis, 2015). Researchers expect that it may have an impact on

professional attitudes and decision making. Xu & Tracey (2014) found a strong positive relationship between ambiguity tolerance and an individual's entrepreneurial inclination, which makes ambiguity tolerance a “characteristics distinguishing entrepreneurs from managers as entrepreneurs will face more ambiguous and uncertain situations” (Xu & Tracey, 2014, p. 18). Students of accounting showed a lower level of ambiguity tolerance than students of law, psychology, and education (Arquero & Tejero, 2009). Among medical doctors, ambiguity tolerance seems to be important especially in specializations that require quick decision making in critical situations, e. g. obstetrics (Yee, Liu, & Grobman, 2014) or emergency medicine (Kuhn, Goldberg, & Compton, 2009).

Some researchers (de Roma, Martin, & Kessler, 2003; Geller, Faden, & Levine, 1990; Weissenstein, Ligges, Brouwer, Maschall, & Friederichs, 2014) believe that ambiguity tolerance can be trained and it should be part of professional training in some professions. Pre-service doctors or educators should be aware of their ambiguity tolerance and its possible impact on their professional attitudes and decision making. Ambiguity tolerance has been studied also among teachers. It has correlated positively with a constructivist teaching orientation (Rittschof, 2016), innovativeness (Nicotera, Smilowitz, & Pearson, 1990), and teachers' creativity (Tegano, 1990). Similarly to medical doctors or social workers, teachers may benefit from a higher level of ambiguity tolerance in their professional lives. Among teachers, ambiguity tolerance may influence their attitudes toward innovative teaching methods, their decision making in challenging classroom situations (e. g., classroom and conflict management, misbehaviour interventions etc.), or may affect their attitudes towards diversity in the classroom (e.g., treating children with special education needs, accepting children from diverse cultural and social settings etc.).

## **Method'**

### ***Participants***

The participants in the study were Slovak pre-service teachers ( $N = 176$ ) from Comenius University in Bratislava, Slovakia. The convenience sampling was applied. The mean age of the sample was 21.19 years ( $min = 19$ ,  $max = 27$ ), with 153 (87 %) female and 23 (13 %) male participants. All participants had finished their secondary school studies and were studying at the University for their bachelor's degree in teacher training for lower or higher secondary school (pupils between 10 and 19 years of age). At the time of data collection participants were studying in the 1<sup>st</sup> year ( $n = 59$ , 33 %), in the 2<sup>nd</sup> year ( $n = 84$ , 48 %), and the 3<sup>rd</sup> year ( $n = 33$ , 19 %) of the bachelor's level of study.

### ***Instruments***

The data were collected via two paper questionnaires and analysed using IBM SPSS 17.0 and IBM Amos 25.0 software. The questionnaires were distributed by the lecturers during their introductory psychology courses for pre-service teachers. The items covered also demographic data and the informed consent.

#### ***The Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTATS-II)***

The scale was created by McClain (2009) as a one-dimensional instrument for measuring the level of tolerance towards ambiguity. The scale consists of 13 items with 5-point Likert scale measuring five different aspects of ambiguity: general ambiguity (items 1, 3, 7, 11, and 13), insolubility (items 2, 5, and 9), unfamiliarity (items 4 and 10), complexity (items 6 and 8), and uncertainty (item 12). MSTATS has been used to assess ambiguity tolerance in various professional settings and language variants (Kajs & McCollum, 2009; Yee, Liu, & Grobman, 2014; Rittschof, 2016; Arquero & Tejero, 2009) and the authors reported adequate validity and reliability of the measure.

#### ***Diversity in the classroom questionnaire – a self-report measure of knowledge and skills***

The questionnaire was created by the authors of this study to assess teachers' self-reported knowledge and skills for the work with children with diverse educational and social needs. It consists of 20 items (intellectual disability, physical disability, visual impairment, auditory impairment, learning disorder, attention deficit disorder, communication disorder, low competence in the language of instruction, ethnicity different from the majority, incomplete family, socially disadvantaged community, food intolerance, intellectual giftedness, religion different from the majority, anxiety disorder, autistic spectrum disorder, epilepsy, diabetes mellitus, adoption, and behaviour disorder) assessing self-reported knowledge and skills for each item within 5-point Likert scale.

## **Results**

### ***Descriptive Analysis and Reliability of MSTATS-II***

MSTATS-II in the sample of Slovak pre-service teachers ( $N = 176$ ) proved to have adequate internal consistency with Cronbach's alpha ( $\alpha = .770$ ), McDonald's omega ( $\omega = .785$ ) and Guttman's split-half coefficient ( $\lambda = .725$ ). The coefficients of skewness and kurtosis (Tables 1 and 2) and Kolmogorov-Smirnov normality test ( $.052$ ;  $p > .05$ ) proved normal data distribution. One-dimensional structure of the instrument was tested by confirmatory factor analysis ( $\chi^2 (65) = 132.977$ ;  $p < .001$ ;  $GFI = .890$ ;  $CFI = .810$ ;  $RMSEA = .077$ ;  $p < .01$ ). MSTATS-II scale mean in our sample was  $M = 39.830$  with standard deviation  $SD = 7.096$  (Tables 1 and 2). The most of the participants in the sample ( $n = 121, 69\%$ ) exhibit

a moderate level of ambiguity tolerance, 22 (13 %) participants exhibit low level (-1SD) and 33 (18 %) participants high (+1SD) level of ambiguity tolerance.

**Gender differences**

Males often consider themselves to be risk takers and more ambiguity tolerant, especially in economic decision making (Brighetti & Lucarelli, 2014). Among medical students, however, women obtained significantly higher ambiguity tolerance scores than men (Weissenstein, Ligges, Brouwer, Maschall, & Friederichs, 2014). In our sample of pre-service teachers, women had higher scores, but significant gender differences were not found. The mean score for ambiguity tolerance (Table 1) in women was 40.092 (*SD* = 7.039) and the mean score in men was 38.087 (*SD* = 7.385). The difference is not significant with low size effect ( $F = .056$ ;  $p = .813$ ;  $t = 1.265$ ;  $p = .207$ ;  $d = .283$ ).

*Table 1 Gender differences in the ambiguity tolerance*

	N	M	SD	SE	skewness	kurtosis	min	max
male	23	38.087	7.385	1.540	-.682	.217	20	51
female	153	40.092	7.039	.569	-.109	-.719	23	54
total	176	39.830	7.096	.535	-.189	-.532	20	54

**Differences in ambiguity tolerance across academic years**

Some researchers (Weissenstein et al., 2014; Geller, Faden, & Levine, 1990) expect that ambiguity tolerance should increase across years of professional training as students are socialized into the profession and need to face various ambiguous profession-related training situations. Our sample comprised pre-service teachers from three academic years of bachelor level of training. The more experienced students had slightly higher scores than the first year students (Table 2), however, these differences were not significant with low size effect (one-way ANOVA  $F = .472$ ;  $p = .624$ ;  $d = .197$ )

*Table 2 Differences in the ambiguity tolerance across academic years*

	N	M	SD	SE	skewness	kurtosis	min	max
1st year	59	39.509	7.532	.981	-.036	-.964	25	52
2nd year	84	39.631	6.591	.719	-.092	-.429	23	52
3rd year	33	40.909	7.638	1.330	-.707	.481	20	54
Total	176	39.830	7.096	.535	-.189	-.532	20	54

**The relation between ambiguity tolerance and inclusive competences of pre-service teachers**

Pre-service teachers self-assessed their inclusive competences (perceived knowledge and skills) for working with diverse educational and social needs of

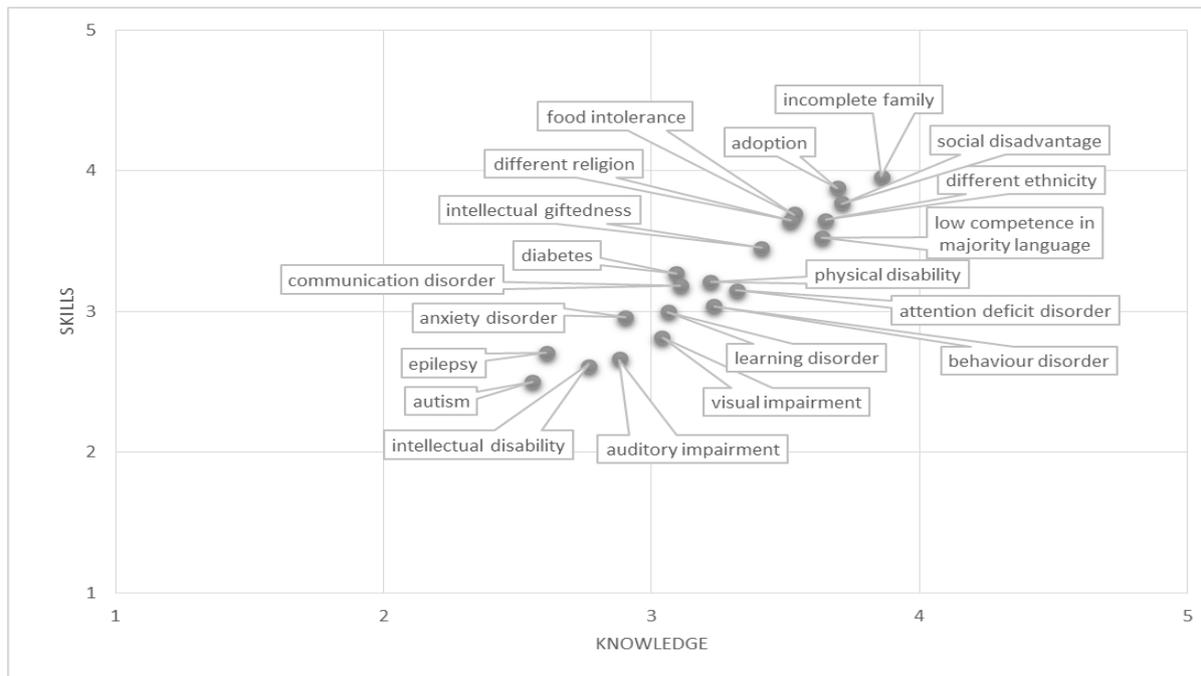
pupils. We found differences in their perceived knowledge and skills for work with various types of diversity in the classroom. Pre-service teachers rated higher their knowledge and skills for work with children with background diversity (cultural, religious or family differences) than for work with children with disabilities and disorders (Fig. 1). The analysis of the relationship between self-reported inclusive competences and ambiguity tolerance, however, did not reveal significant results. The correlations between MSTATS-II scores and the item ratings of Diversity in the classroom questionnaire were significant only in six items out of 20.

*Table 3 Correlations between tolerance of ambiguity and self-reported inclusive competences*

	knowledge			skills		
	M	r	sig.	M	r	sig.
auditory impairment	2.88	<b>.185*</b>	.014	2.66	<b>.263**</b>	.000
incomplete family	3.86	-.108	.152	3.95	<b>-.165*</b>	.028
intellectual giftedness	3.41	<b>-.166*</b>	.027	3.45	-.108	.154
diabetes mellitus	3.09	<b>-.151*</b>	.045	3.27	-.067	.378
adoption	3.69	<b>-.166*</b>	.028	3.88	-.111	.143
behaviour disorder	3.23	.131	.083	3.04	<b>.189*</b>	.012

\* Correlation is significant at the 0.05 level (2-tailed). \*\* Correlation is significant at the 0.01 level (2-tailed).

Note: No adjustment for multiple testing was performed.



*Figure 1 Self-reported skills and knowledge about diversity in the classroom (for more detailed analysis see Sokolová & Andreánska, 2018)*

## Discussion and conclusion

This study aimed to investigate ambiguity tolerance among pre-service teachers as an important profession-related personality variable in occupations dealing with uncertainty and ambiguous situations. *The Multiple Stimulus Types Ambiguity Tolerance Scale-II* (McClain, 2009) had an adequate internal consistency in the Slovak pre-service teachers' sample. Overall level of ambiguity tolerance in our sample ( $M = 39.83$ ) was higher than reported by Arquera & Tejero (2009) for students of accounting ( $M = 37.95$ ;  $d = .252$ ), but slightly lower than mean scores of the students of law ( $M = 40.54$ ;  $d = .096$ ) or psychology and education ( $M = 40.52$ ;  $d = .090$ ).

Similarly to Geller's, Faden's & Levine's (1990) study among medical students, our results showed that ambiguity tolerance does not change significantly throughout teacher training, even the third year students had the highest average score of ambiguity tolerance, the difference was not statistically significant with low size effect. The process of socialization into the profession (Geller, Faden, & Levine, 1990) does not seem to have a significant impact upon the level of ambiguity tolerance among pre-service teachers in our sample. Female pre-service teachers in our sample obtained slightly higher scores in ambiguity tolerance than males; however, the difference was not significant with low size effect. Moreover, these results cannot be generalised as far as the sample was not homogenous for gender.

Regarding the link between ambiguity tolerance and perceived competences for dealing with diversity in the classroom, significant correlations were found only in six examples of diversity out of twenty. These correlations were low, showing the minimal relation between pre-service teachers' ambiguity tolerance and their self-report of knowledge and skills for work with children with diverse educational needs. These results may suggest that pre-service teachers either over-rated their competences or their self-assessment of knowledge and skills is independent of their level of ambiguity tolerance. To understand better the relationships between ambiguity tolerance and pre-service teachers' perception of classroom diversity, we may analyse not only their self-reported competences but also their attitudes and stereotypes.

Ambiguous and uncertain situations are part of teacher's every day working life. The ability to deal with these situations affects a teacher's effectiveness, decision making, and classroom management. Teachers who are aware of their level of ambiguity tolerance and understand its potential impact upon their thoughts and behaviour in the classroom may take advantage of this knowledge and develop more effective strategies how to deal with unpredictable situations in the classroom environment. Similarly to Geller, Faden & Levine (1990), we can recommend to assess and train ambiguity tolerance among pre-service teachers

through experiential learning, reflective practice, video-based training or social-psychological training courses (cf. Lemešová, 2014; Sokolová, Lemešová, & Jursová Zacharová, 2014; Sokolová, 2018).

### Acknowledgement

The study was supported by the Slovak Ministry of Education, Science, Research and Sports grant projects: VEGA 1/0409/17, VEGA 1/0620/16 and KEGA 060UK-4/2017.

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