

BELIEFS ABOUT THE HIGH ABILITIES OF TWICE – EXCEPTIONAL STUDENTS WITH DYSLEXIA

Preliminary findings on the construction of multiple measures of Beliefs About High Abilities of Twice-Exceptional Children Scales

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Acknowledgements

This work was supported by the Learning and Instruction Laboratory established within Chair for Educational Sciences, University of Rijeka, Faculty of Teacher Education. Authors are thankful for the time students invested in providing their answers on the questionnaire and to their teachers that allowed data collection during their regular classes.

Summary

In the initial phase of Beliefs About High Abilities of Twice-Exceptional Children with Dyslexia Scale construction, we piloted the first version of a scale focused on beliefs about students with dyslexia. A convenience sample of 159 students (97.5% female, Age: M=20.67; SD=1.67) from Teacher Education Study Program at the University of Rijeka, Faculty of Teacher Education participated in this pilot study. Students provided necessary socio-demographic information and results on a 15-item scale intended to measure beliefs about high abilities of twice-exceptional children with dyslexia. Preliminary results indicated that the scale has satisfactory psychometric characteristics. The exploratory component analysis provided evidence for a single construct measure with a tentative possibility for differentiation of set of items related to innovative, creative and artistic thinking from the set of items related with visual learning and processing abilities. Discriminant validity of these two sets needs to be further evaluated. Single construct scale demonstrated high reliability. Students from higher years of study program had significantly higher scale scores when compared with students from first two years, indicating that positive beliefs about high abilities of twice-exceptional students with dyslexia became more prominent as students advance through study program.

1. Introduction

1.1. Who are twice-exceptional (2e) students with dyslexia?

Term twice-exceptional or 2e describes students who are both intellectually gifted (based on a standardized assessment) and are also diagnosed with diverse disabilities, which includes students with dyslexia (The International Dyslexia Association, 2013). Dyslexia is one of the most common forms of twice-exceptionality, with a prevalence of around 2% in the general population (Montgomery, 2003). The co-occurrence of dyslexia and high abilities is still insufficiently researched. There are different explanations about etiology of twice-exceptionality related to dyslexia: (1) neurodiversity - naturally occurring variations in human neurology, (2) possibility that special interests, practice or experience develop extraordinary strengths, that are not primarily connected to reading, (3) the brain in the early phases of neurodevelopment is wired in such a way that learning to read is difficult while learning in other ways is not (The International Dyslexia Association, 2013).

1.2. Characteristics of 2e students with dyslexia

2e students with dyslexia manifest typical characteristics of dyslexia that are primarily related to problems in the acquisition of reading and writing skills and high abilities / specific talents in many areas of cognitive functioning. Sometimes high abilities can mask symptoms of dyslexia, and difficulties of many students may not be recognized on time. Although there is no unique description of high abilities of 2e students with dyslexia, in scientific and professional literature these specific abilities are usually mentioned: 1) Innovative, creative and artistic thinking (e.g. original and creative thinking, Cancer, 2016); 2) artistic expression (e.g. in music, dance, art or acting, Chakravarty, 2009); 3) vivid memory of events (Eide and Eide, 2012); 4) scientific thinking (Eide and Eide, 2012); 5) verbal reasoning (Berninger and Abbott, 2013); 6) Visual learning and processing (e.g. rapid visual-perceptual processing, Bireley et al., 1992); 7) visual-spatial memory (Tafti et al., 2009); 8) visual thinking and imagining (West, 1991); 9) visual representation of space (Shaywitz, 2003); 10) 3D perception of objects and their rotation (Armstrong, 2010); 11) organization of sensory stimulus into a unified perception (Eide and Eide, 2012). Literature also indicates that 2e students with dyslexia can also have above-average motor performance and focus on active sports (Shaywitz, 2003) and are advanced in the use of technology (Montgomery, 2003).

1.3 Teaching 2e students with dyslexia

Preservice teacher education significantly contributes to the formation of student's beliefs about the characteristics of children with special educational needs, including twice-exceptional students with dyslexia. A belief that students with dyslexia can have high abilities in some cognitive domains and that they also can be gifted is a significant predictor of future teachers' ability to recognize such students and to build on their strengths, rather than focus only on supporting them in domains that are challenging for them. Results of previous research suggest that teachers and teacher students are informed and have positive beliefs about the possible giftedness of students with dyslexia (eg., Wadlington and Wadlington, 2005). However, they do not feel sufficiently prepared to teach 2e students generally (Rowan and Townend, 2016).

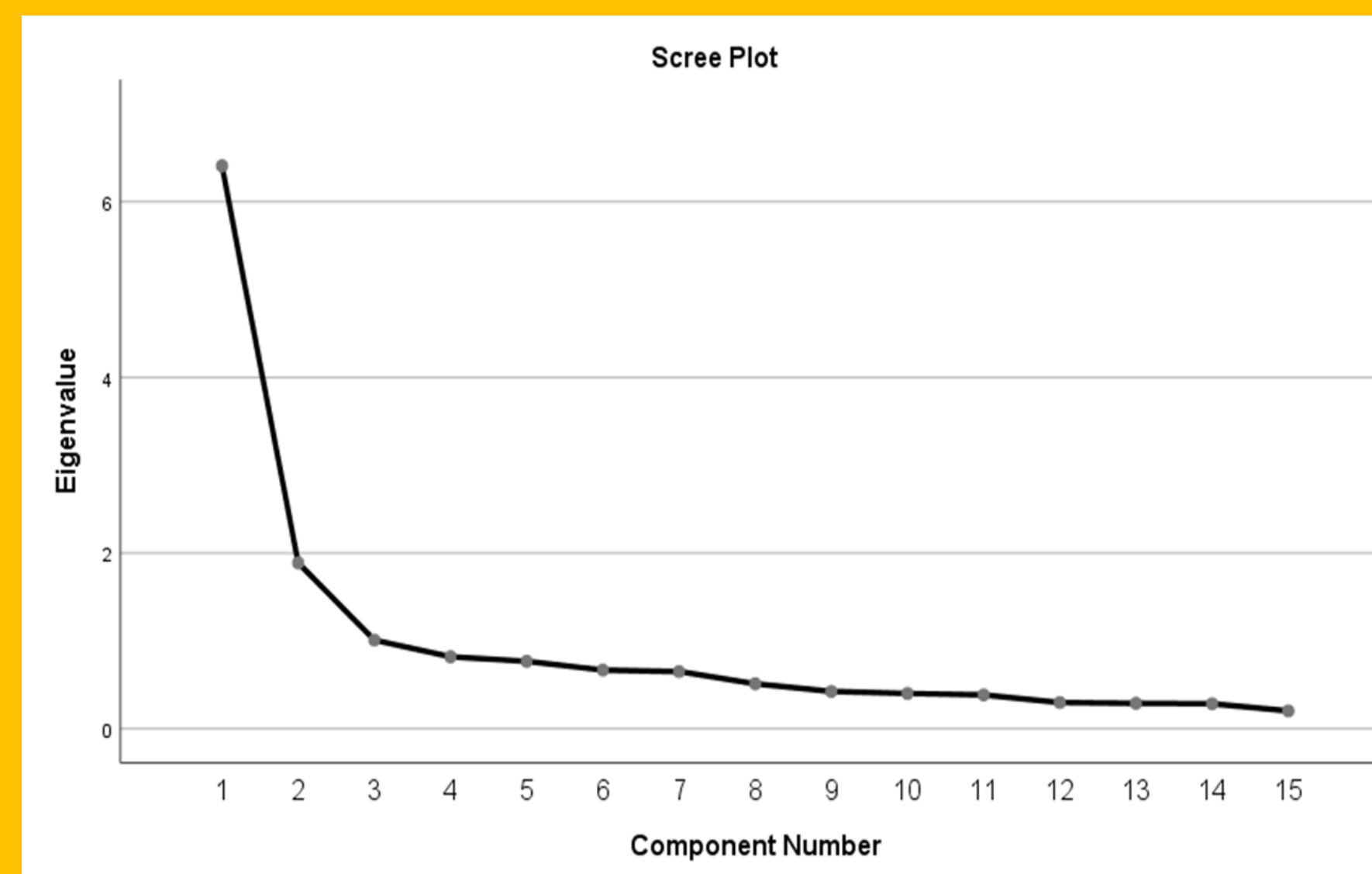
2. The main goal of the study

The main goal of this paper is to present findings from a pilot study designed to evaluate the measurement characteristics of the Beliefs about High Abilities of Students with Dyslexia Scale. In particular, we wanted to examine the factor structure and reliability of this scale. In addition to that, we wanted to determine whether different generations of students, from first-year students to final-year students that enrolled the Teacher Education Study Program at the University of Rijeka, Faculty of Teacher Education differ in their beliefs about high abilities of students with dyslexia.

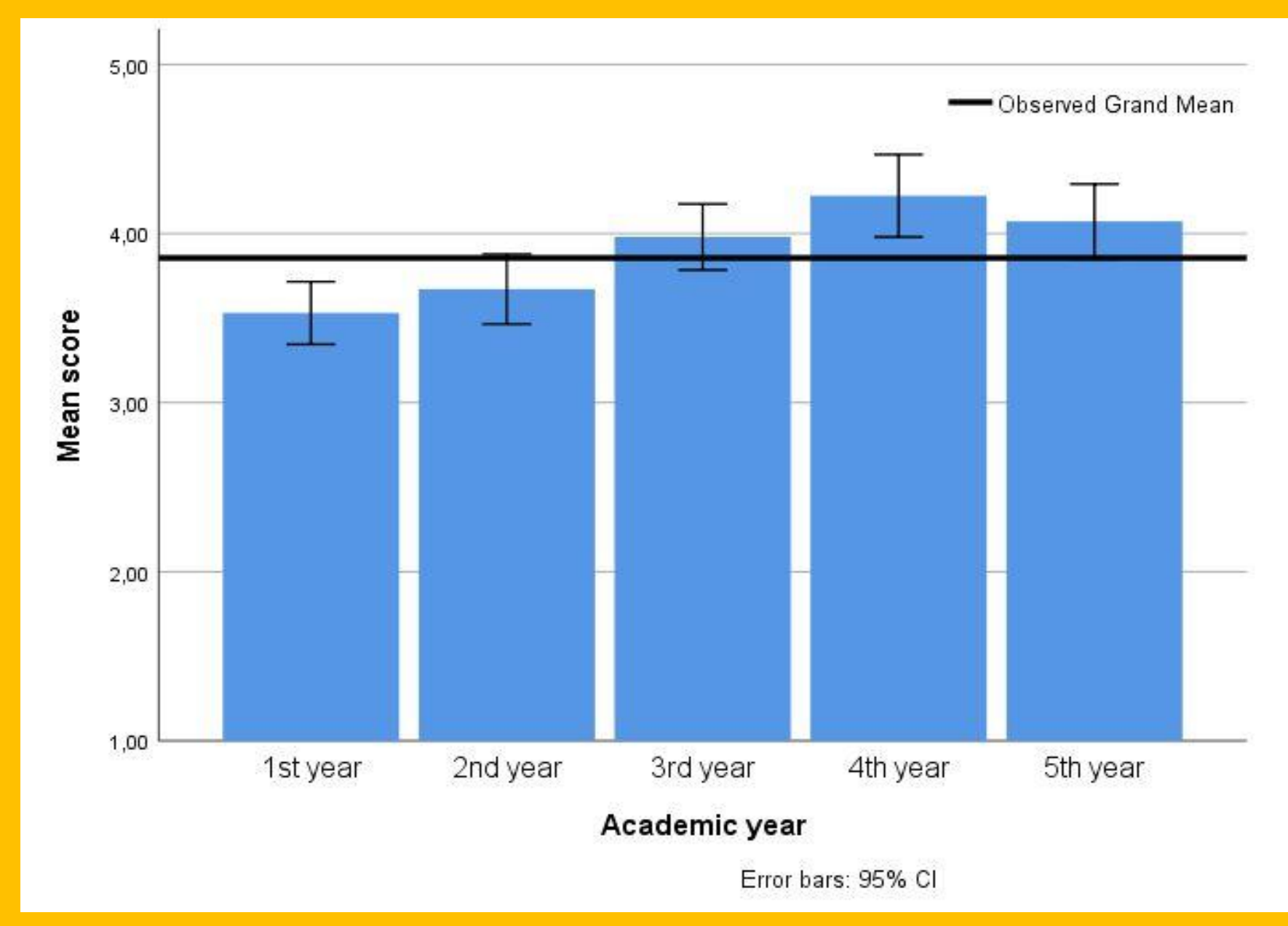
Table 1. Scale items (Croatian) ordered according to students' average agreement with the item

| Item | Descriptive Statistics | |
|---|------------------------|--------------------------|
| | Mean Statistic | Std. Deviation Statistic |
| TE09 ...originalnog i kreativnog mišljenja | 4,19 | 1,014 |
| TE02 ...predočavanja, slikovnog mišljenja i zamišljanja | 4,15 | ,936 |
| TE08 ...umjetničkog izražavanja (npr. glazbi, plesu, slikovnosti ili glumi) | 4,13 | 1,091 |
| TE03 ...slikovno - prostorne memorije | 4,06 | ,943 |
| TE14 ...žvopisne memorije događaja (izuzetno osjetno iskustvo zvukova, boja, taktilnih senzacija i emocija) | 3,99 | ,904 |
| TE10 ...izražavanja ideja i osjećaja | 3,99 | 1,049 |
| TE06 ...vizualnog predočavanja prostora | 3,91 | ,966 |
| TE07 ...vizualnog učenja | 3,81 | 1,007 |
| TE15 ...istraživačkog razmišljanja/promišljanja | 3,80 | ,960 |
| TE05 ...motoričke izvedbe i usmjerenosti na aktivne sportove | 3,75 | 1,112 |
| TE12 ...naprednog korištenja tehnologije (tzv. "kompiuterski maheri") | 3,69 | ,988 |
| TE11 ...verbalnog rasuđivanja | 3,65 | ,988 |
| TE01 ...organizacije osjeta u perceptivnu cjelinu | 3,62 | ,832 |
| TE13 ...vizualizacije u tri dimenzije | 3,62 | ,899 |
| TE04 ...brzog vizualno - perceptivnog procesiranja | 3,48 | 1,078 |
| Valid N (listwise) | | |

Picture 1. Scree plot with tentative support for a single factor structure (need for further investigation of a two-factor structure solution)



Picture 2. Scale means for students enrolled in different academic years



References

- Armstrong, T. (2010). *Neurodiversity: Discovering the extraordinary gifts of autism, ADHD, dyslexia, and other brain differences*. Cambridge: Da Capo Press.
- Berninger, V. W., & Abbott, R. D. (2013). Differences between children with dyslexia who are and are not gifted in verbal reasoning. *Gifted Child Quarterly, 57*(4), 223-233.
- Bireley, M., Languis, M., & Williamson, T. (1992). Physiological uniqueness: A new perspective on the learning disabled/gifted child. *Roeper Review, 15*(2), 101-107.
- Cancer, A., Manzoli, S., & Antonietti, A. (2016). The alleged link between creativity and dyslexia: Identifying the specific process in which dyslexic students excel. *Cogent Psychology, 3*, 1190309.
- Chakravarty, A. (2009). Artistic talent in dyslexia—A hypothesis. *Medical Hypotheses, 73*(4), 569-571.
- Eide, B.L., & Eide, F.F. (2012). *The dyslexic advantage: Unlocking the hidden potential of the dyslexic brain*. New York: Hudson Street Press.
- Exley, S. (2003). The effectiveness of teaching strategies for students with dyslexia based on their preferred learning styles. *British Journal of Special Education, 30*(4), 213-220.
- The International Dyslexia Association. (2013) *Gifted and Dyslexic: Identifying and Instructing the Twice Exceptional Student*. IDA: Baltimore. Retrieved from <https://dyslexiaida.org/gifted-and-dyslexic-identifying-and-instructing-the-twice-exceptional-student-fact-sheet/>
- Montgomery, D. (2003). *Gifted & Talented Children with Special Educational Needs*. Double Exceptionality. London. David Fulton Publishers
- Rowan, L., & Townend, G. (2016). Early career teachers' beliefs about their preparedness to teach: Implications for the professional development of teachers working with gifted and twice-exceptional students. *Cogent Education, 3*(1) 1242458.
- Shaywitz, S. (2003). *Overcoming Dyslexia. A new and complete science-based program for reading problems at any level*. USA. Vintage Books Edition
- Tafti, M. A., Hameedy, M. A., & Baghal, N. M. (2009). Dyslexia, a deficit or a difference: Comparing the creativity and memory skills of dyslexic and nondyslexic students in Iran. *Social Behavior and Personality: an international journal, 37*(8), 1009-1016
- West, T. G. (1991). *In the mind's eye: Visual thinkers, gifted people with learning difficulties, computer images, and the ironies of creativity*. Amherst, NY, USA: Prometheus Books.

Poster presented at the 2nd International Scientific Conference "Brain and Mind: Promoting the Individual and Community Well-Being", Department of Psychology Catholic University of Croatia, 12 – 14 December 2019, Zagreb, Croatia

3. Method

3.1. Participants

A convenience sample of 159 students of all academic years (97.5% female, Age: M=20.67; SD=1.67) from Teacher Education Study Program at the University of Rijeka, Faculty of Teacher Education participated in this pilot study.

3.2. Measures

In the initial phase of construction of the Beliefs About High Abilities of Twice-Exceptional Children Scales, we piloted the first version of a scale focused on beliefs about students with dyslexia. For the purpose of this research, an online questionnaire was constructed. The questionnaire consists of a protocol with socio-demographic variables (gender, age and year of study) and Beliefs about High Abilities of Students with Dyslexia Scale. This scale consists of 15 items that examine to what extent students with dyslexia can have more developed specific cognitive abilities compared to other students. Seven items are related to high abilities in innovative, creative and artistic thinking, and six items describe high abilities in visual learning and processing. One item refers to high abilities in motor performance and active sports, and one item is related to high abilities in the advanced use of information and communication technology. The scale has a Likert-type response format ranging from 1: "I do not agree at all" to 5: "I completely agree".

3.3. Procedure

The survey was conducted at the beginning of the academic 2019/20 through the online Limesurvey platform among students of all five years from the integrated bachelor and master Teacher Education Study Program at the University of Rijeka, Faculty of Teacher Education. Students provided their responses during regular classes, using their smartphones. For students who could not access the questionnaire through smartphones, access was provided in the computer rooms.

4. Results

Preliminary results indicated that the scale has satisfactory psychometric characteristics. The exploratory component analysis (Picture 1: Scree-plot) provided evidence for a single construct measure with a tentative possibility for differentiation of two separate sets of items: first related to innovative, creative and artistic thinking and the second related to visual learning and processing abilities. Items with high loadings on these two factors are presented in the order of descending factor loadings. The first item presents factor marker variable.

F1: Innovative, creative and artistic thinking (α=0.88)

- TE10 ... expressing ideas and feelings
- TE09 ... original and creative thinking
- TE08 ... artistic expression (e.g. music, dance, drawing or acting)
- TE15 ... research thinking/reflection
- TE11 ... verbal reasoning
- TE14 ... vivid event memories (intensive sensory experience of sounds, colours, tactile sensations and emotions)
- TE05 ... motor performance and focus on active sports
- TE12 ... advanced use of technology (called "computer wiz")

F2: Visual learning and processing abilities (α=0.85)

- TE04 ... rapid visual - perceptual processing
- TE07 ... visual learning
- TE03 ... visual - spatial memory
- TE06 ... visual representation of space
- TE02 ... imagination, pictorial thinking and imagining
- TE01 ... organizations of sensations into a perceptual whole
- TE13 ... visualizations in three dimensions

Discriminant validity and reliability of these two sets need to be further evaluated. Single construct scale demonstrated high reliability (Cronbach alpha= 0.9). The results of the descriptive analysis indicate that students have positive beliefs about the high abilities of students with dyslexia on all items of the Scale. Students from higher years of study program had significantly higher scores when compared with students from the first two years, indicating that positive beliefs about high abilities of twice-exceptional students with dyslexia became more prominent as students advance through study program.

5. Discussion and conclusions

The results of this preliminary study indicate a high level of future teacher students' awareness of the high abilities of students with dyslexia. The differences in results among students from different academic years indicate a significant impact of the experiences that students gain by progressing through the study program on their beliefs about the high abilities of students with dyslexia. To conclude, it should be pointed out that the contribution of this research is twofold: first and foremost in the scientific approach to the measurement of investigated construct and additionally in illuminating future teacher's beliefs about the potential of twice-exceptional students. In further studies, it is necessary to elaborate the existing scale items according to the proposed two-factor structure and to determine its discriminant validity and reliability. The research confirmed the importance of initial teacher education in creating positive beliefs about the high abilities of 2e students with dyslexia. Future research needs to examine student's specific knowledge and skills for inclusive teaching that respects 2e students' difficulties but also provides more challenging learning opportunities in domains where these students can demonstrate their high abilities.