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Research Article

Fathers' Views and Understandings on Promoting Creativity in Children Aged 24-36 Months: A Qualitative Study

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ABSTRACT

Early childhood is a very important period for the development of children's creativity. While mothers have been the main focus of studies investigating the role of parents in early childhood, recent studies indicate that fathers also have a major impact on their child's development. The study aims at investigating the opinions of fathers about creativity, whether they play creativity-supporting games with their children, and their views about the role of the education system in fostering children's creativity. A qualitative model was used in this study. The study results indicate that most fathers define creativity as associated with intelligence and believe that the education system does not support creativity. 71% of fathers reported being engaged in creative game plays with their children (e.g., puzzles, toy blocks, and unstructured games), but their concept of creative play is not very elaborate. A more knowledgeable and creativity-informed approach may be needed for fathers to be able to fully support their children's development.

Keywords: early childhood, creativity, fathers, qualitative model

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Introduction

In recent years, the importance of creativity in children's development has been emphasized. Epstein (2008) has stated that creativity enhances children's academic performances, learning processes, and lifelong learning, and highlighted the increasing importance of creativity, imagination, and deviationism in the process of education. Thus, both parents and educators are encouraged to provide optimal environments in which children can improve and enhance their creative skills.

The Concept of Creativity

Torrance (1974) defines creativity as an intuitional process which involves the following: being sensitive to deficiencies; outlining difficulties; creating assumptions to solve these difficulties; testing the assumptions; comparing the results, and retrying if necessary. According to Peterson and Seligman (2004), creativity is the ability to produce original but adaptive, viable ideas, which requires one to be open to new experiences and flexible in one's thoughts and behaviors. The present study aligns most with Vygotsky's (2004) socio-cultural constructivist perspective, which emphasizes that creativity involves generating new ideas and behaviors, a process inherently present in children's play. In children, the development of play progresses in parallel with the emergence of imagination and creativity. During the period from infancy to the first two years, children play movement-oriented games with intense energy: Crawling after moving toys, throwing toys from the highchair repeatedly, climbing to high places, running on tiptoe, turning on the ground, and similar motion-based games are predominant in the first two years of life. Once the child has become familiar with the surrounding objects, and mental and language development have reached a certain maturity, creativity begins to emerge. Thus, between the ages two and four, movement-oriented games give place to activities based on balanced physical strength, imagination, and the employment of symbolic

thinking skills. In addition, children employ creative and imaginative playing to make everyday activities enjoyable (Çetin & Ata, 2022; Schousboe, 2013).

Supporting Creativity in Early Childhood

Environmental factors such as the family, the school or other social parameters can either nurture or suppress creativity (Çetin et al., 2015; Turan et al., 2023). The development of creativity is undoubtedly possible (Guilford, 1958). However, it is important to support children's creativity from early childhood because early interventions are generally more effective when it comes to the development of mental capacities. Considering the beneficial effects of high-quality early childhood education on the cognitive, linguistic, physical, emotional, and social development of children, early childhood education plays a key role in the future of public health (Aral et al., 2010). Early childhood, when children are most susceptible to external stimuli, is the most critical period in their growth and development. Early childhood is also recognized as a crucial phase for the development of creative potential due to children's natural curiosity, uninhibited imagination, and openness to exploration. While creative development continues throughout life and can be influenced by various factors, nurturing creativity during the preschool years can provide a strong foundation for future creative expression (Yaşar & Aral, 2010).

The Role of Parents in Supporting Creativity

The family, which constitutes the first social environment of the child, is of primary importance in the development of the child's creativity. The influence of parenting practices and styles, as well parental attitudes on the child's creativity are well-established and supported by research (Dursun & Ünüvar, 2011; Miller & Gerard, 1979; Pugsley & Acar, 2018). Comparing the parenting attitudes and behaviors of highly intelligent and highly creative high school students, Getzels and Jackson (1961) found that more creative students had more supportive parents. Also, less creative children have usually been found to be raised by authoritarian parents displaying high levels of control and less warmth, whereas more creative children have usually been

raised by authoritative parents who respect the children's interests, grant them autonomy, and show confidence in their abilities (Fearon et al., 2013). Creative children more often come from families where there is a great deal of parental explanation of family decisions and rules, and where children are given a voice in establishing the rules. Tang et al.'s (2022) study with a large-scale dataset collected from over 5,000 students and their parents in China found that parental support and creative self-efficacy significantly predicted student creative self-efficacy, which strongly predicted student general and creative ideation behaviors. Kim et al. (2015) reported that a creative home environment positively influences creativity in early childhood. The creative family environment provides an enriched learning environment by valuing play, and by providing creative and flexible role models (Lew & Cho, 2013). Furthermore, children's creativity can be nurtured through creative activities involving family participation (Çetin & Özözen Danacı, 2017). Previous studies have also shown that creative parents are more likely to cultivate creative children (Kim & Park, 2020). The long-term studies of Singer and Singer (1998) showed that parents of creative children are also imaginative, creative, adventurous and encourage their children to be creative. Finally, a study exploring parents' perspectives on environments that nurture creativity (Gulliksen, 2018) found Norwegian parents to emphasize time and opportunity for free play as important for developing creativity and to hold the belief that creativity should be a self-initiated activity.

It should be noted that most of the available studies on the role of the family in children's development have focused on mothers; it is only recently that researchers have come to explore and understand the role of fathers in children's development (Tezel Şahin, 2007). Consequently, there is still not as much evidence on how they influence children's development as there is on mothers (Cabrera, 2020). Nevertheless, the relevant literature reveals how the role of the father as the person who earns money and makes a living has transformed into fathers who take active roles in the lives of their children by participating in their care, education, and growth (Mercan & Şahin, 2017). A number of studies on paternal involvement with different types of

families have revealed the contributions of fathers to different areas of their children's development (Rollè et al., 2019). More specifically, it has been stated that the active role of fathers in the development of their children has important effects on the cognitive, linguistic, and social-emotional development of the children at the age of 2-3 years (Cabrera et al., 2007; Mills-Koonce et al., 2015). Although the long-term effects of fathers taking an active role in the care and development of children from infancy become visible in early childhood, they emerge more clearly in childhood and adolescence (Cabrera et al., 2018). These children appear to have a stronger sense of social competence and less depressive symptoms (Coleman et al., 2004). A systematic review of longitudinal studies confirms that paternal engagement contributes positively to children's cognitive and social development (Sarkadi et al., 2008). In a study conducted in three different provinces in Turkey, it was found that the active participation of fathers in children's lives promotes children's academic skills and supports all other areas of development (Aydın Kılıç, 2016). In addition, as fathers' sense of commitment and responsibility for their children increases, the time they spend with them also increases and supports children's cognitive, social, and emotional development with a decrease in anxiety levels and undesirable behaviors (Garfield & Chung, 2006). In a study examining the relationship between father participation in early childhood, children's early learning, and academic success, it was found that there was a significant relationship between father participation and children's early learning and academic success (McWayne et al., 2013). In studies comparing mother and father participation in children's education, although the level of maternal involvement was higher than that of fathers, it was concluded that there was a positive relationship between fathers' participation and their children's academic skills (Baker, 2018; Duursma, 2014; Kim et al., 2015).

The Present Study

Studies conducted in Turkey and elsewhere state that the perception of fathers' role has changed over time, and fathers nowadays have a more

active role in their children's development, leading to positive outcomes (Lewis & Lamb, 2003; Mercan & Şahin, 2017; Sarkadi et al., 2008). However, studies investigating fathers' views about children's creativity and how they can take part in supporting their creativity are limited. Yet, determining fathers' views on supporting children's creativity in early childhood, which is a critical developmental period, is essential for the active participation of fathers in this process. Therefore, the present study aimed at exploring views on creativity held by fathers of children aged 24-36 months. More specifically, the study addressed the following research questions:

- *How do fathers conceive of creativity and the factors that hinder its development?*
- *How do fathers perceive the role of the education system in promoting their children's creativity?*

Method

Study Design

In this study, a qualitative research method was used (Patton, 2014). Creswell (2013) defined qualitative research studies as a method that works by analyzing non-numerical data by gathering a wide field of study under one subject. The data collection process was carried out through in-depth, open-ended interviews (Patton, 2014) and content analysis was used to extract relevant information from these data.

Participants

Convenience sampling was used to recruit participants. The sample of the present study consisted of the fathers of 18 children aged 24-36 months, attending the Little Hacettepeliler Nursery and ZTB Little Angels Nursery and Childcare Center.

The demographic characteristics of the fathers participating in the study are presented in Table 1.

Table 1

The demographic characteristics of the fathers that are participating in the study

Demographic Data	Category	Frequencies	Percentage
Age	23-30	2	11.1
	31-35	7	39
	36-40	6	33.3
	41-45	1	5.5
	46-50	2	11.1
Educational Status	High School	2	11.9
	Bachelor's Degree	7	39
	Master's Degree	8	44.4
	Ph.D.	1	5.5
Profession	Engineer	2	11.1
	Academician	5	27.8
	Medical Doctor	4	22.2
	Judge	1	5.5
	Free Lancer	3	16.7
	Office Employee	3	16.7
Number of Children	1 child	11	61.1
	2 children	5	27.8
	3 children	2	11.1
Age of the Child	24-30 months	8	44.4
	31-36 months	10	55.6
Monthly Income	2500-3500 TL	8	5.5
	3600-4900 TL	10	27.8
	5000+ TL	12	66.7

Data Collection Tools

Based on an analysis of the relevant literature, the researchers developed 10 open-ended questions (e.g., *"Do you play creativity-supporting games with your child?"; "Can you define creativity?"*) to explore the creativity-related views of the fathers (see Appendix A for a full list of the

questions). This questionnaire was reviewed by three child development and education experts for face-validity control. Moreover, a form was prepared to collect demographic data and characteristics of participants and the form was filled during face-to-face interviews. More specifically, we employed the structured interview technique (Robson & McCartan, 2016; Wragg et al., 1994) to collect these data. The structured interview technique, as described by Robson and McCartan (2016), involves the use of a fixed set of questions with pre-specified and standardized wording. Typically, the response alternatives in such interviews are also fixed and pre-specified, although there may be a small number of questions allowing for open-ended responses. This approach is commonly used in qualitative research to gather specific information from participants, such as demographic characteristics, and to categorize their responses according to predefined categories.

Data Collection Process

After getting the necessary official permissions, including an ethical approval of the study, its purpose and procedure were explained to potential participants. Those who were willing to participate in the study signed a written consent. Next, the demographic data form and the creativity questionnaire were filled out through face-to-face interviews between the researcher and the participant.

Data Analysis

To analyze the data, we used qualitative content analysis, the aim of which is to systematically convert large volumes of text into a highly organized and concise summary of important results (Erlingsson & Brysiewicz, 2017). To prevent data loss, the data obtained were digitalized and analyzed in depth with the help of MaxQDA qualitative data analysis program. A set of "key codes" was created by examining the answers of the participants one by one, and the sentences expressed by the fathers were gathered under this code heading and analyzed. For example, the answers given to the question

in which we asked the first three words that came to the minds of fathers about creativity were gathered under the title of "creativity words", allowing them to be seen in a graphical whole and easy to interpret.

Results and Discussion

Fathers' Conceptions of Creativity

Intelligence

Curiosity ← Define creativity in three words → Imagination
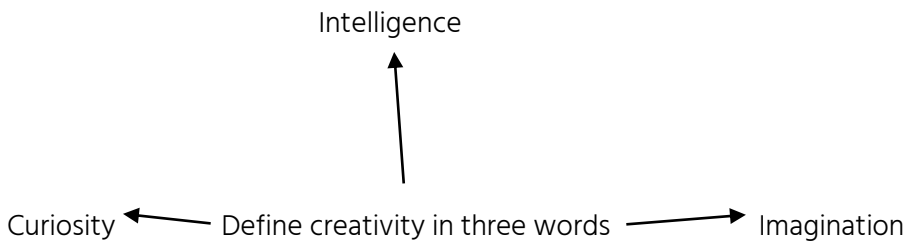
Figure 1. Model of fathers' conceptions of creativity

As shown in Figure 1, the majority of fathers defined creativity by associating it with intelligence, curiosity, and imagination. All of them mentioned intelligence first. However, some of the fathers associated creativity with words such as questioning, problem-solving, innovation, entertainment, self-development, flexibility, and harmony.

There are many studies in the relevant literature examining the relationship between intelligence and creativity (Guignard et al., 2016; Plucker et al., 2020; Wallach & Kogan, 2020). Some of these studies report a relationship between intelligence and creativity, supporting the views of the fathers in our study. In a study conducted with gifted children, Virgolim (2005) investigated the relationship between creativity and intelligence and reported a significant relationship between the two. In other studies, however, this relationship was reported to be weak. According to Nusbaum and Silvia (2011), creativity and intelligence are regarded as weakly related but fundamentally different features in recent studies.

Despite the relationship between curiosity and creativity, the two constructs have rarely been the focus of research attention simultaneously. There are limited studies trying to explain the relationships between curiosity and creativity (Kashdan & Fincham, 2002; Karwowski, 2012; Chang & Shih, 2018). In early childhood, children are naturally very curious and ask all sorts of questions (who, what, where, how, when). In other words, they are exploring the world around them, discovering new things. On the other hand, imagination, which has a very important role in the emergence of original and new products, is clearly important for creativity. According to some research, one of the most important characteristics of creative individuals is their strong imagination (Leboutiller & Marks, 2003). Another study also concluded that imagination has a significant and positive effect on creative thinking and openness to change (Çankaya et al., 2012).

Overall, the above findings suggest that fathers may benefit from a more nuanced understanding of creativity. While their definitions of creativity somewhat align with psychological accounts, there appear to be specific aspects or dimensions that fathers may not fully grasp. In particular, fathers tend to associate creativity primarily with intelligence. Admittedly, study participants did name other psychological qualities in their definitions of creativity. Specifically, they seem to think that creativity is intelligence + imagination, and curiosity. However, established psychological accounts of creativity emphasize that creativity involves a broader range of cognitive processes and behaviors beyond mere intelligence (Guilford, 1958; Runco, 2007). While related studies exist in this field (Silvia, 2015; Weiss et al., 2020), further research is warranted to delve into the nuances of fathers' conceptions and to pinpoint areas where their perspectives may deviate from established psychological theories. Moreover, it is essential to consider how these differences in understanding may impact parenting and the support provided to children's creative development. Therefore, there is a pressing need to enhance fathers' knowledge about the multifaceted nature of creativity and its distinctiveness from intelligence.

Fathers' responses concerning their views on the creative person yielded rich metaphors, shedding light on the significance and value attributed to creativity. For instance, one father likened a creative person to a bee, drawing parallels between creativity and the process of collecting nectar from diverse and colorful flowers to produce honey. This metaphor suggests that creative individuals draw inspiration from a multitude of sources, synthesize ideas, and transform them into valuable and original creations. It highlights the role of creativity in synthesis and innovation. Another father compared the creative individual to a Swiss army knife, emphasizing their ability to offer solutions to a wide range of problems based on their knowledge and skills. This metaphor underscores the resourcefulness, versatility and problem-solving capacity associated with creative thinking. A third metaphor likened creative people in society to the heart of a healthy person. It conveyed that when creativity doesn't function effectively, similar to a malfunctioning heart, it can have detrimental consequences for both the individual and the society as a whole. This metaphor highlights the vital role creativity plays in the functioning and development of society. Lastly, a father compared creative individuals to the 'brain' of society, emphasizing their capacity to excel in finding innovative solutions to complex challenges and problems. This metaphor underscores the intellectual and problem-solving capacities of creative individuals, as well as their major role in bringing the society forward. Collectively, these metaphors reflect the high regard for creativity and its multifaceted contributions, including problem-solving, innovation, and societal development. It is evident that creativity holds a central place in the perceptions of the interviewed fathers, and that its value transcends mere individual expression. To further contextualize and analyze these metaphors, we will delve into a psychological examination, linking the participants' views with the existing literature on creativity and its societal implications in the subsequent sections.

The Extent of Creative Gameplays

As shown in Figure 2, the majority of the fathers stated that they played creative games with their children. One possible reason for the relatively high number of fathers who reported being engaged in creative gameplays with their children might be that the majority of participants had higher education levels and were university graduates. However, it should also be noted that, when asked to explain the content of these games, most participants did not answer the question, and among those who did, there were no specific creativity-supporting elements (Møller, 2015). As an example of the games that fathers play with their children, one father stated that they were playing creative games such as "putting Legos into a tray-like object and pushing them under the sofa as an oven", another father "getting on my feet and using me like a robot", and another father "using our toys as pots and plates we cook very good food, and we eat it with pleasure .... We build farms with our toy animals; we feed them and imitate their sounds". In other words, it appears that fathers considered all the games they played with their children as creative. This indicates that fathers do not have enough information about the concept of creative play.
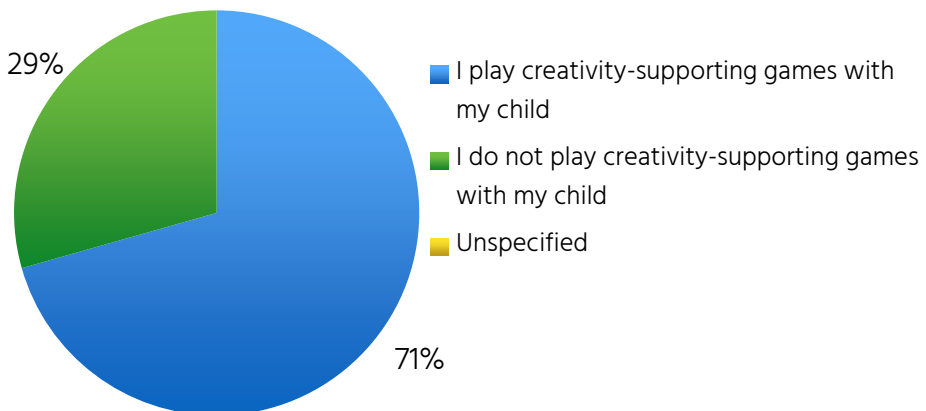
Figure 2. Fathers' state of playing creative games with their children

The fact that most of the participants were young fathers with only one child might have caused an increase in their playtime with the child. Parents are the most important factors influencing the development of creativity in children. The combination of a conscious parenting approach and enriched environmental conditions has been shown to enhance children's creativity (Faizi et al., 2012). The game, which is very important in child development in early childhood, is also a factor that can elaborate creativity. To examine the changes in the creativity scores of children attending kindergarten and primary school, Bogoyavlenskaya (2013) conducted a longitudinal study and reported that the creativity of six-year-old children decreased when they attended primary school (Bogoyavlenskaya, 2013). For this reason, parents must play creative games with their children in early childhood. It is also stated that the active role of fathers, whose importance in child development has been emphasized in recent years, is very effective in children's cognitive, linguistic, and social-emotional development (Cabrera et al., 2007). Fathers need to play creative games with their children in this context. In addition, Craft et al. (2012) emphasized the importance of playing creative games and reported that children were willing to produce creative ideas and games with new materials, to communicate with others while using these materials, and to share their ideas with others.
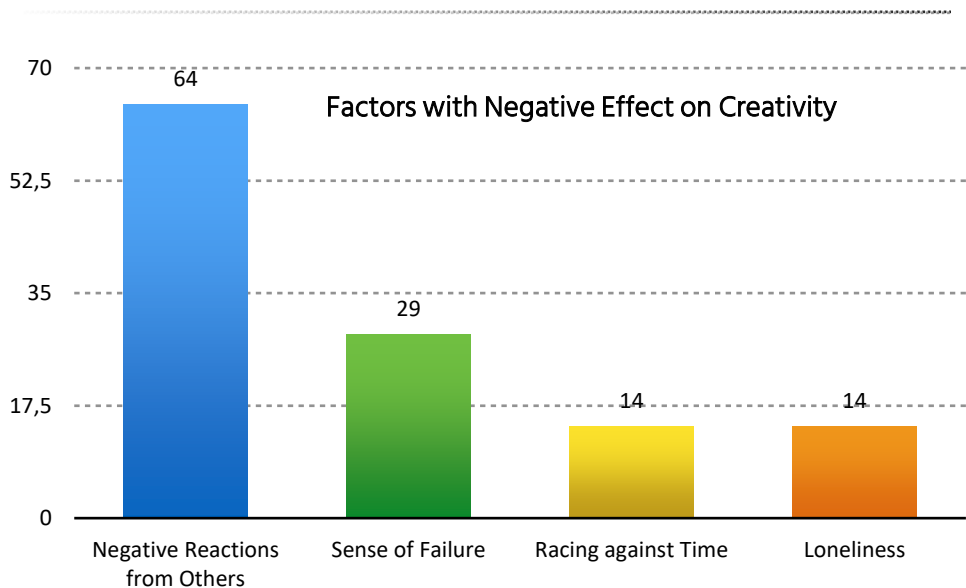
Figure 3. Fathers' views on the factors that adversely affect creativity

Fathers' Views on the Factors That Adversely Affect Creativity

The fathers identified multiple factors that negatively affect creativity (Figure 3). However, the top factor, mentioned by as many as 64% of participants, were negative reactions or criticism by family members, friends, or colleagues. Other common factors included a feeling of failure (29%), having to race against time (14%), and loneliness (14%). Some of the answers that fathers gave about situations that could affect their creativity negatively are as follows: *"You can't, no, it's not, attitudes and behaviors like you don't know negatively affect"; "the change I make is not accepted"; "the way other people treat my creative work as if it were their idea".* Such views on the factors that impede creativity might be due to the hectic and stressful work environments of the participating fathers, as most of them were academicians and doctors.

It is well known that creativity can be abated in childhood due to various reasons. Pressure, control, and criticism are indeed among the behaviors that negatively affect creativity in children (Kemple & Nissenberg, 2000). Creative thinking can be hampered by the fear of looking ridiculous and inadmissible to others and being mocked and rejected by family or friends (San, 2004).

Fathers' Views on the Role of the Education System in Developing Creativity

According to the results, 63% of the fathers stated that the education system does not support creativity, while 37% of them indicated otherwise (Figure 4). This might be because fathers evaluated the education system as a whole and not only kindergarten and preschool.
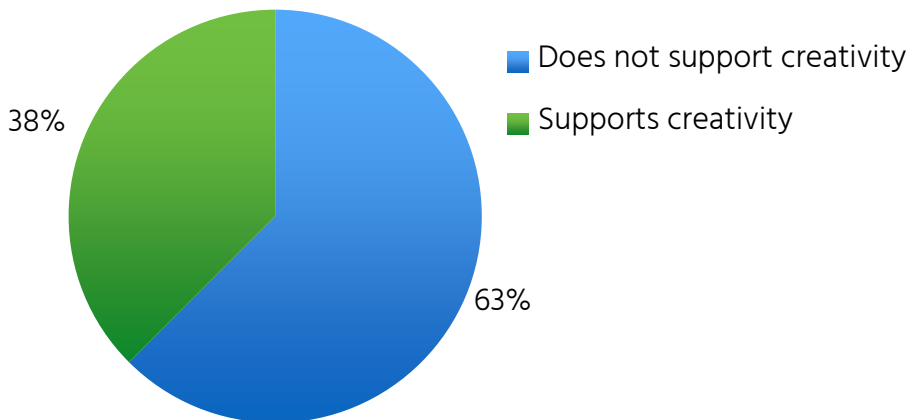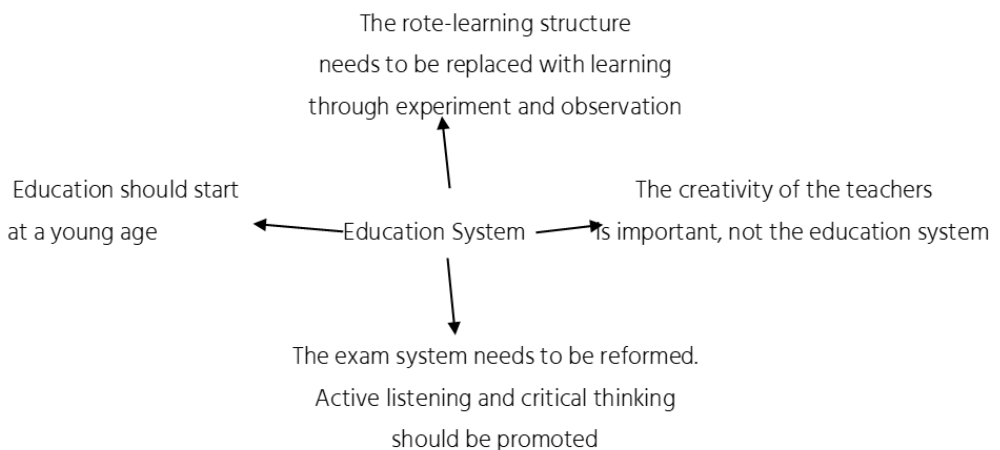

Figure 4. Father's views about the effect of education on creativity

The objectives of an education program aiming at developing creativity are raising creativity awareness, enhancing creative attitudes, preparing learning experiences that will improve creative thinking, understanding the process of creativity, and teaching creative thinking

techniques (Özden, 2003). In this context, the majority of the participating fathers believed that these objectives are not addressed sufficiently in the education system in our country. However, the fathers had various thoughts about how the education system (Figure 5) could support creativity, as illustrated by the following answers:

"*The creativity of the instructors at the head of the system is important, not the system. No matter how creative the system is, if the trainer is not creative or is closed to research and development, the result will fail.*"; *The number of lessons that will improve thinking rather than memorization can be increased, and more emphasis can be given to art-oriented lessons.*"

The rote-learning structure
needs to be replaced with learning
through experiment and observation

Education should start
at a young age

Education System

The creativity of the teachers
is important, not the education system

The exam system needs to be reformed.
Active listening and critical thinking
should be promoted

Figure 5. Model for fathers' views on the education system and creativity

Most of the fathers emphasized the necessity for changing the rote-learning-based structure of the education system and increasing the chance for experiments and observations for children to learn through experience. They also indicated the importance of the creativity of the teachers and believed that there should be no exam anxiety after the preschool period for the children. According to the statements of the fathers, they found preschool a more creativity-supporting period, whereas the rest of the school years tend to be mainly based on rote learning exposing children to anxiety

over exams and scores. This opinion of the participating fathers may stem from the fact that their children were already enrolled in a preschool and the fathers were actively participating in this educational process. There are many studies in the literature supporting these views of fathers. It is reported that affluent materials, equipment, and toys offered to children in the classrooms can support and improve creative thinking (Makhmalbaf & Do, 2007). Craft (2006) stated that creativity can develop spontaneously in educational environments where open-ended questions are asked, and the learning process is supported through trying new things. Whereas in a rote-learning-based education system, creativity is negatively affected. Furthermore, as the fathers stated, the role of teachers in creating a creative educational environment is quite prominent. Therefore, teachers' views on the concept of creativity are an important environmental factor for the development of creativity in children (Runco & Johnson, 2002).

Craft (2006) stated that creativity can develop spontaneously in educational environments where open-ended questions are asked, and the learning process is supported by trying new things, whereas in a rote-learning-based education system, creativity is negatively affected. Furthermore, as the fathers stated, the role of teachers in creating a creative educational environment is quite prominent. Therefore, teachers' views on the concept of creativity are an important environmental factor for the development of creativity in children (Runco & Johnson, 2002).

Implications and Recommendations

Understanding parents' and especially fathers' perceptions regarding their children's creativity and practices that could facilitate its development could have important implications for intervention programs, making this study not only scientifically, but also potentially practically relevant. It is recommended that fathers be trained in creative games and how they can support their children's creativity through these games. For example, they could be introduced to a wider repertoire of possible games to play with their children, including free art activities (with pencils, paints, kneading materials,

waste materials, small blocks, etc.), music studies (listening to music, exploring sounds, keeping rhythm, singing, creating various sounds, etc.), dramatic play, listening to poetry or nursery rhyme, creating activities, and also they can play symbolic game to develop creativity skills. Moreover, training and informative seminars should be held on topics such as increasing awareness about the importance of creativity in the development of children, and how to avoid discouraging, creativity-hindering situations and reactions in daily life and especially when playing games with one's children. Future studies are also recommended to investigate this issue more extensively.

Limitations

This study has several limitations that warrant consideration. Firstly, there may be a sampling bias as the fathers who participated in the study are not representative of the broader population of fathers, potentially limiting the generalizability of the findings. Secondly, reliance on self-report methods, such as face-to-face interviews and open-ended questionnaires, introduces the possibility of self-report and social desirability bias, where participants may provide socially desirable responses or not fully represent their true beliefs. Additionally, the study's context-specific findings may not apply universally to fathers from different cultural or socio-economic backgrounds. While efforts were made to ensure the reliability of coding, qualitative analysis is subject to interpretation and potential coder bias. Furthermore, the scope of data analysis was limited to specific open-ended questions, potentially overlooking other relevant aspects of fathers' views on creativity. Finally, the study was conducted at a specific point in time, and fathers' views on creativity may change over time, as their children grow and develop new skills. Additionally, cultural factors influencing fathers' perspectives on creativity may not have been fully explored.

Conclusions

The study results indicate that most fathers define creativity as associated with intelligence and believe that the education system does not support creativity. 71% of fathers reported being engaged in creative game plays with their children (e.g., puzzles, toy blocks, and unstructured games), but their concept of creative play is not very elaborate. A more knowledgeable and creativity-informed approach may be needed for fathers to be able to fully support their children's development.

Conflict of interest

No potential conflict of interest was reported by the author(s).

Data availability statement

Data files are available upon a reasonable request.

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Appendix A Open-ended questions

1. What do you think creativity is? How would you define it?

2. Do you find yourself creative as a father?

3. Are there any factors that negatively affect your creativity? What are they?

4. How would you define a creative child?

5. What do you do to support your child's creativity?

6. Do you play games with your child to support his/her creativity? What kind of games do you play?

7. What do you think creative play is? Can you explain it with an example?

8. What are your thoughts about the education system?

9. How do you think the education system affects children's creativity?

10. What are your ideas as a father to support creativity in education?

Research Article

Trait emotional intelligence in mothers of children with autism spectrum disorders

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ABSTRACT

Studies that point to the difficulties in terms of communication, social skills, reading and interpreting emotions in parents of children with autism spectrum disorder (ASD), as well as those regarding the protective function of trait emotional intelligence (TEI), are not complemented by studies directly comparing TEI of caregivers of children with ASD and those of neurotypical children. The aim of this study was to examine differences in TEI between mothers of children with ASD and mothers of children of typical development, as well as the effect of different sociodemographic factors on maternal TEI. Participants were 156 mothers, divided into two groups: 1) mothers of children with ASD (ASD group) (N = 78) and 2) mothers of neurotypical children (control group) (N = 78). Participants completed the Serbian adaptation of the Trait Emotional Intelligence Questionnaire (TEIQue), short form, and answered various questions about their own and their children's sociodemographic characteristics. Results suggest equivalence of global and factor-level TEIQue scores. Inspection of facet-level differences revealed higher scores on Stress management, and lower scores on Assertiveness in the ASD group compared to controls. Maternal age was not related to their TEI, while Well-being and Optimism of mothers decreased with increasing of ASD child`s age. Mothers with lower education had significantly lower TEI scores on several factors and facets regardless of the child's ASD status.

Obtained findings significantly contribute to the knowledge of perceived emotional self-efficacy in mothers of children with ASD which could elicit additional research and various mental health professional programs aimed at this vulnerable population.

Keywords: Autism spectrum disorder, Trait emotional intelligence, Caregivers, Parental functioning, Emotional self-efficacy

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Introduction

Theory and research argue that autism-like traits are not limited to individuals diagnosed with autism spectrum disorder (ASD), but rather that they vary throughout the general population, with less severity (Gökçen et al., 2014). Therefore, the scientific community has introduced the term "broad autism phenotype", which refers to the findings that individuals from the general population, and especially relatives of persons with ASD, often have mild forms of autistic-like characteristics, such as social and communication difficulties (Bishop et al., 2008; Hurley et al., 2006; Ruser et al., 2007). For example, research shows that parents of children with ASD achieve lower scores on pragmatic language (Hurley et al., 2006) and emotion recognition tasks (Hu et al., 2018; Palermo et al., 2006), and show higher levels of alexithymia, social anhedonia (Berthoz et al., 2013), as well as an aloof and rigid personality (Hurley et al., 2006).

Furthermore, experience of caring for an offspring diagnosed with ASD is immensely reflected in personal well-being (Gray, 2002; Lovell et al., 2014; Machado Junior et al., 2014; Preece & Almond, 2008; Stuart & McGrew, 2009; Whitehead et al, 2015), family dynamics (Marquenie et al., 2011; Shakhmalian, 2005) and work and social life of caregivers (Benderix et al, 2007; Blanchard et al, 2006; Shakhmalian, 2005). On the other hand, use of adaptive coping strategies, resilience, ability to tolerate uncertainty, and wider social support network have all been linked to better psychological adjustment (Jones & Passey, 2004; Smith et al, 2012; Su et al, 2017; Whitehead et al., 2015).

The intensity of parental difficulties increases with the severity of the child's symptoms (Herring et al., 2006; Hoffman et al., 2009; Ruiz-Robledillo & Moya-Albiol, 2014). Furthermore, parental stress increases as the child with ASD grows older, because parents become increasingly aware of the permanence of their difficulties, the system lacks support, and there is a risk of burnout in parents (Milačić Vidojević, 2008). Although there are differences in the symptomatology of male and female children with ASD (Baron-Cohen, 2000), research in our country shows that parental stress is not related to the

gender of the child with ASD. It seems that parents do not differentiate between boys and girls and are equally concerned about their children (Milačić Vidojević, 2008).

One personality trait that affects processing of stressful events – the trait emotional intelligence (TEI) – has been largely neglected in previous studies with caregivers of children with ASD. TEI is conceived as a constellation of self-perceptions pertaining to efficiency in perceiving, understanding, managing, and utilizing our own and other people's emotions (Petrides et al., 2018). TEI represents "emotional self-efficacy" and denotes the construct of emotional intelligence (EI) that is within the personality domain and is implied by the application of self-reporting measures (Petrides et al., 2007). Petrides and Furnham (2001) identified 15 facets which represent the sampling TEI domain: Self-esteem, Emotion expression, Self-motivation, Emotion regulation, Happiness, Empathy, Social awareness, Impulsiveness (low), Emotion perception, Stress management, Emotion management, Optimism, Relationships, Adaptability and Assertiveness. According to the TEI theory, these facets are organized into four interrelated factors: Well-being (features related to dispositional mood), Self-control (self-efficacy in regulating emotions and/or impulses), Emotionality (self-efficacy in perceiving and expressing emotions), and Sociability (self-efficacy in interpersonal utilization and management of emotions) (Petrides, 2009).

Findings within the general population show that TEI is a strong predictor of well-being and mental health (Martins et al, 2010), in part because high TEI individuals show superiority in coping with stressful situations, which they tend to perceive as a challenge rather than as a threat (Mikolajczak & Luminet, 2008; Mikolajczak et al., 2006). Research in specific populations (e.g., dementia caregivers) confirms that TEI could be particularly important in reducing stress, anxiety, and depression of those living in prolonged stressful circumstances (Weaving et al., 2014). Mental health benefits of TEI are also evident in a small number of studies performed on caregivers of children with ASD. Self-assessed emotional intelligence is negatively related to the level of perceived stress (Lovell & Wetherell, 2016) and positively associated with the

maternal quality of life (Alibakhshi et al., 2018). It can decrease perceived burden levels (Ebied et al., 2021) and contribute to better physical health outcomes (Ruiz-Robledillo & Moya-Albiol, 2014).

Research shows that EI components may develop over time with age or life changes (Palmer et al., 2003). While some authors found that EI scores are positively related to age, but begin to decrease past the age of 65 (Bar-On, 1997, as cited in Derksen et al., 2002), other researchers indicated that TEI is negatively correlated with age (Jolić Marjanović & Altaras Dimitrijević, 2014). The findings unequivocally show that TEI is positively associated to level of education (Altaras Dimitrijević & Jolić Marjanović, 2021; Pérez-Díaz et al., 2021) and academic performance (Perera & DiGiacomo, 2013; Petrides et al., 2004).

Aims and rationale for this study

Findings from studies that point to possible difficulties in terms of communication, social skills, as well as in reading and interpreting emotions in parents of children with ASD, and generally promising findings about the protective function of TEI are not complemented by studies directly comparing TEI of caregivers of children with ASD and those of neurotypical children. To the best of our knowledge, only one study has previously reported such findings (Premanand et al., 2014), showing that parents of children with ASD in India score lower then controls on Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF), specifically on TEI global score, Well-being, Self control and Sociability. Though parents of children with ASD scored low on Emotionality, the difference was not statistically significant.

Following this gap, the current study compared TEI of mothers of children with ASD and mothers of neurotypical children, specifically focusing on facet-level TEI profile differences. Based on previous findings (Premanand et al, 2014), we assumed that mothers of children with ASD will have lower scores on TEI compared to mothers of neurotypical children (H1). More specifically, we believe that significant between group differences will be

present in both TEI factor-level scores (H1a) and in the overall facet-level TEI profile (H1b). We also put this hypothesis in line with the findings of studies that have shown that parents of children with ASD have difficulties with reading, recognizing and processing emotions (Berthoz et al., 2013; Hu et al., 2018; Palermo et al., 2006), which represent abilities integrated within the EI domain.

Building upon previous findings about significant age and education effects on TEI (cf. Altaras Dimitrijević & Jolić Marjanović, 2021), this study also sought to investigate differences in maternal TEI when we take into account maternal demographic characteristics. Being that older and less educated individuals exhibit lower levels of TEI, while older and less educated caregivers experience higher stress levels (Duarte et al., 2005; Smith et al, 2001), we expect that older and less educated mothers will obtain lower TEI scores in comparison to younger and more educated mothers (H2).

Furthermore, we expected to find significant interaction effect between mother's group membership and level of education: we believe that less educated mothers of children with ASD will obtain the lowest TEI scores (H3). We put this hypothesis in line with the findings of studies that have shown that parents of children with ASD exhibit higher levels of stress than parents of neurotypical children (Machado Junior et al., 2014), and those which indicate that less educated caregivers experience higher stress levels than caregivers with higher level of education (Duarte et al., 2005; Smith et al, 2001). Thus, we believe that the interaction of stressful cirqumstances will be associated with lower perceived self-efficacy, that is, maternal TEI.

As ASD child's age is positively correlated with higher parental stress (Milačić Vidojević, 2008), but the ASD child's gender does not contribute to parental functioning (Herring et al., 2006), we expected to find significant negative correlation between maternal TEI and ASD children's age, but no association with ASD child's gender (H3).

Method

Participants and Procedure

Data for this study was gathered in a convenience sample of 78 mothers of children with clinically verified ASD (ASD group) and 78 mothers of neurotypical children (control group).

Age range of the ASD group of mothers was 24 to 62 years (M = 38.54, SD = 7.81). With respect to education, 55.1% had finished high school and 44.9% had a university diploma; 50% was unemployed. The majority of mothers was from urban settlements (89%) and married (83.3%). Approximately one third (37.2%) of mothers had one child (N = 29), 42.3% of mothers had two children (N = 33) and 20.5% of mothers had three children (N = 16).

Their ASD children aged from 3 to 30 years (M = 7.99, SD = 5.73) and 77% were male. Mothers were recruited either during the child`s regular speech and language therapy within Institute for Experimental Phonetics and Speech Pathology „Đorđe Kostić" in Belgrade, Serbia (N = 25) or through Facebook groups whose names contained keywords referring to ASD (N = 53).

This study was conducted in accordance with the Declaration of Helsinki and it complied with APA ethical standards. All mothers completed the questionnaire on a voluntary basis and gave informed consent to participate. Confidentiality of data was guaranteed.

The subsample of mothers for the control group was drawn from a larger community sample of employed adults from urban and suburban settlements employed at various positions within a large dairy company, that had been recruited in a separate study (see details in Jolić Marjanović & Altaras Dimitrijević, 2014). Selection for the control group was based on four criteria: age, number of children, education level (high school/university), and marital status (single/married). As a result, the age range of mothers in the control group was 26 to 58 (M = 41.63, SD = 6.63), 17.9% had one child, 33.3%

finished university, and 83.3% were married. As mentioned earlier in the text, all mothers from the control group were employed.

Statistical comparison showed that the two subsamples were matched with respect to number of children ($F_{(1,154)}$ = 2.36, p = .127), education ($\chi^2_{(1)}$ = 2.18, p = .095) and marital status ($\chi^2_{(1)}$ = .00, p = .585), but somewhat different when it comes to the mean age ($F_{(1,154)}$ = 7.10, p = .009). Mothers also differed in therms of their employment status ($\chi^2_{(1)}$ = 52.00, p = .000).

Measures

All mothers made self-assessments on 30 items of the Trait Emotional Intelligence Questionnaire (TEIQue), short form (TEIQue-SF) (Petrides, 2009), using a 7-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree). In our study, we used the Serbian translation of TEIQue-SF (Jolić Marjanović & Altaras Dimitrijević, 2014). The TEIQue-SF yields a global TEI score, as well as four factor scores (Well-being, Self-control, Emotionality and Sociability). Factor scores are derived from items examining 15 facets (Adaptability, Assertiveness, Emotion expression, Emotion management, Emotion perception, Emotion regulation, Impulsiveness (low), Relationships, Self-esteem, Self-motivation, Social awareness, Stress management, Empathy, Happiness and Optimism). Alphas for this sample resonated with previously established values in our and other countries (cf. Feher et al., 2019), for Global score (α = .84), as well as for factors: Well-being (α = .66), Self-control (α = .44), Emotionality (α = .63) and Sociability (α = .50).

All participants also completed questions of the TEIQue's 'About you' section supplying relevant demographic information, while mothers from the ASD group additionally provided data on age, gender, and treatment status of their ASD diagnosed child.

Data Analysis

To analyse and describe the sample, descriptive statistic measures were used. Whilst controling for maternal age, between group differences in TEI were inspected using ANCOVA (global score) and MANCOVA (factor and facet scores). Also, to examine the effect of ASD child's gender on maternal TEI, we used ANOVA (global score) and MANOVAs (factor and facet scores).

To inspect the interaction effects between mother's group membership and education on their TEI, we used a two-way ANOVA (global score) and two separate two-way MANOVAs (factor scores). Bivariate correlations were used to examine the relationship between TEI and maternal and child's age. Data was analyzed in SPSS package, v. 20.

Results

Between group differences in maternal TEI were first inspected using ANCOVA (global score) and MANCOVA (factor scores), suggesting equivalence of global and factor-level TEIQue scores, when maternal age is being controlled.

Additional MANCOVA was performed to inspect facet-level differences in TEI, whilst controling for maternal age, resulting in a significant outcome for multivariate tests (Wilks λ=.81, $F_{(15,139)}$ = 2.18, p = .010, partial η^2 = .190). Further inspection confirmed that this result was due to significant differences in just two facets: Stress management and Assertiveness. The ASD group reported higher means for the former, and lower means for the latter facet. All data is shown in Table 1.

Table 1

Differences on TEI global, factor and facet level between two maternal groups

	ASD group	Control group	$F(df_1, df_2)$	p	partial η^2
	M (SD)	M (SD)			
Global score	5.06 (.81)	5.11 (.63)	.44 (1, 153)	.506	.003
Factors					
Well-being	5.49 (1.06)	5.63(.78)	1.38 (1, 153)	.364	.005
Self control	4.92 (.93)	4.81 (.86)	.83 (1, 153)	.440	.004
Emotionality	5.15 (1.02)	5.19 (.87)	.21 (1, 153)	.648	.001
Sociability	4.65 (1.07)	4.76 (.78)	1.12 (1, 153)	.291	.007
Facets					
Self-esteem	5.87 (.95)	5.87 (1.04)	.02 (1,153)	.900	.000
Emotion expression	5.03 (1.48)	5.00 (1.46)	.00 (1, 153)	.992	.000
Self-motivation	5.07 (1.25)	4.99 (1.15)	.02 (1, 153)	.898	.000
Emotion regulation	4.72 (1.30)	4.92 (1.22)	.76 (1, 153)	.386	.005
Happiness	4.73 (1.70)	5.04 (1.19)	2.31 (1, 153)	.130	.015
Empathy	4.88 (1.37)	5.16 (1.67)	1.84 (1, 153)	.177	.012
Social awareness	5.15 (1.36)	5.11 (1.23)	.01 (1, 153)	.940	.000
Impulsiveness (low)	4.90 (1.27)	4.89 (1.54)	.01 (1, 153)	.937	.000
Emotion perception	5.15 (1.32)	5.04 (1.07)	.07 (1, 153)	.798	.000
Stress management	5.15 (1.40)	4.63 (1.21)	6.91 (1, 153)	.009	.043
Emotion management	4.67 (1.29)	4.38 (1.01)	2.01 (1, 153)	.158	.013
Optimism	5.86 (1.25)	5.97 (1.05)	.64 (1, 153)	.423	.004
Relationships	5.56 (1.46)	5.55 (1.48)	.04 (1, 153)	.840	.000
Adaptability	5.01 (1.37)	5.29 (1.39)	1.84 (1, 153)	.177	.012
Assertiveness	4.13 (1.91)	4.78 (1.45)	7.85 (1, 153)	.006	.049

Note. ASD group=Mothers of children with ASD; Control group=Mothers of typically developing children

A two-way ANOVA, with mother's group membership and education as fixed factors and global TEI score as a dependent, resulted in non-significant interaction and group membership effects, along with significant education effect ($F_{(1,152)}$ = 8.85, p = .003, partial η^2 = .055), implying that mothers with a university diploma had a higher overall score on TEIQue-SF than mothers with high school education.

Next, two separate two-way MANOVAs with the above independants and factor, that is, factor-level TEI scores as dependents, were performed. The first resulted in non-significant multivariate test results and significant between-subject effects of education for Well-being, Self-control, and Sociability, showing that mothers with high school education had significantly lower means on these subscales regardless of the ASD status of their child. Neither of the effects was significant for Emotionality.

The second two-way MANOVA, again resulted in non-significant multivariate tests, but revealed several significant effects of both facets and their interaction: significant group membership effect was confirmed for Stress management (higher in the ASD group) and Assertiveness (higher in the control group) (Table 1). Education had a significant effect on Self-motivation, Impulsiveness (low), Adaptability and Assertiveness, all in favor of mothers holding a university degree. Interaction effect was present for Emotion regulation, where university educated mothers of children with ASD were more similar to mothers with a high school diploma from the control group than to their education level counterparts ($F_{(1,152)} = 5.84$, $p = .017$, partial $\eta^2 = .037$). All descriptive measures are shown in Table 2.

Table 2

Effect of education on maternal TEI global, factor and facet level scores

		ASD group M (SD)	Control group M (SD)	F (df1, df2)	p	Partial η^2
Global score	HS	4.91 (.85)	4.99 (.60)	8.85 (1,152)	.003	.055
	UN	5.25 (.73)	5.35 (.61)			
Factors						
Well-being	HS	5.38 (1.02)	5.48 (.77)	4.85 (1,152)	.029	.031
	UN	5.62 (1.11)	5.91 (.74)			
Self-control	HS	4.70 (.95)	4.78 (.81)	4.40 (1,152)	.038	.028
	UN	5.20 (.83)	4.89 (.97)			
Emotionality	HS	5.08 (1.09)	5.06 (.95)	3.14 (1,152)	.079	.020
	UN	5.25 (.93)	5.45 (.62)			
Sociability	HS	4.50 (1.24)	4.60 (.70)	6.80 (1,152)	.010	.043

	UN	4.83 (.78)	5.07 (.86)			
		Facets				
Self-esteem	HS	5.83 (1.06)	5.73 (1.10)	2.576 (1,152)	.111	.017
	UN	5.93 (.81)	6.15 (.86)			
Emotion expression	HS	4.88 (1.61)	4.91 (1.46)	1.472 (1,152)	.227	.010
	UN	5.21 (1.30)	5.17 (1.47)			
Self-motivation	HS	4.81 (1.24)	4.84 (1.10)	7.105 (1,152)	.009	.045
	UN	5.39 (1.22)	5.31 (1.20)			
Emotion regulation	HS	4.44 (1.25)	5.04 (1.16)	.412 (1,152)	.522	.003
	UN	5.07 (1.30)	4.67 (1.33)			
Happiness	HS	4.56 (1.52)	4.90 (1.20)	2.651 (1,152)	.106	.017
	UN	4.94 (1.90)	5.31 (1.13)			
Empathy	HS	4.80 (1.46)	5.07 (1.16)	1.202 (1,152)	.275	.008
	UN	4.99 (1.25)	5.35 (1.18)			
Social awareness	HS	5.01 (1.54)	4.99 (1.31)	2.365 (1,152)	.126	.015
	UN	5.31 (1.09)	5.35 (1.02)			
Impulsiveness (low)	HS	4.64 (1.22)	4.65 (1.65)	8.043 (1,152)	.005	.050
	UN	5.23 (1.27)	5.36 (1.21)			
Emotion perception	HS	5.22 (1.25)	4.88 (1.10)	.563 (1,152)	.454	.004
	UN	5.06 (1.41)	5.35 (.97)			
Stress management	HS	5.02 (1.57)	4.63 (1.24)	.404 (1,152)	.526	.003
	UN	5.30 (1.16)	4.63 (1.18)			
Emotion management	HS	4.72 (1.45)	4.27 (.97)	.289 (1,152)	.592	.002
	UN	4.60 (1.06)	4.60 (1.08)			
Optimism	HS	5.74 (1.29)	5.82 (.95)	3.462 (1,152)	.065	.022
	UN	6.00 (1.21)	6.27 (1.18)			
Relationships	HS	5.42 (1.51)	5.36 (1.65)	3.214 (1,152)	.075	.021
	UN	5.73 (1.39)	5.92 (.98)			
Adaptability	HS	4.72 (1.39)	5.19 (1.46)	4.512 (1,152)	.035	.029
	UN	5.37 (1.27)	5.50 (1.23)			
Assertiveness	HS	3.78 (2.04)	4.54 (1.42)	7.625 (1,152)	.006	.048
	UN	4.57 (1.67)	5.27 (1.39)			

Note. HS= Mothers with high school education; UN=Mothers with university degree

No significant maternal employment status differences within the ASD group were revealed by means of ANOVA for the global score ($F_{(1, 76)}$ = 3.83, p = .054, partial η^2=.048) and MANOVAs for factor (Wilks λ = .94, $F_{(4,73)}$ =

.47, p = .375, partial η^2 = .056) and facet-level scores (Wilks λ = .76, $F_{(15,62)}$ = 1.28, p = .240, partial η^2 = .237).

Bivariate correlations of TEI global, factor, and facet-level scores with mother's age were non-significant in both groups, which is why age was not included as a covariate to improve estimation of TEI means in mother groups.

No significant child gender differences within the ASD group were revealed by means of ANOVA for the global score ($F_{(1,\,76)}$ = .00, p = .956, partial η^2 = .000) and MANOVAs for factor (Wilks λ = .98, $F_{(4,73)}$ = .47, p = .759, partial η^2 = .025) and facet-level scores (Wilks λ = .86, $F_{(15,62)}$ = .69, p = .790, partial η^2 = .142). In both MANOVAs subsequent tests of between subject effects were also non-significant. In addition, only two bivariate correlations between the child's age and TEI scores were statistically significant in the ASD group: *Well-being* (r = -.22, p = .048) and *Optimism* (r = -.23, p = .041).

Discussion

The present study aimed to examine the TEI of mothers of children with ASD, and compare it with TEI of mothers of neurotypical children showed equivalent global and factor-level TEIQue scores for the two maternal groups. Such results contradict our hypothesis set in accordance with the findings of a study in which parents of children with ASD achieve significantly lower scores on Well-being, Self-control and Sociability (Premanand et al, 2014). The obtained discrepancies can be interpreted within the cultural and status differences, as well as the different sample structures. In India, where the previous research was carried out, ASD children are stigmatized and discriminated, while professional services are rare and mostly inaccessible (Minhas et al., 2015; Premanand et al., 2014), which can lead to lower perceived emotional self-efficacy of this vulnerable parental population. In contrast, the respondents in our study were mothers from urban areas who had higher socioeconomic status and whose children were included in treatment, which could speak to certain TEI levels. In support of this hypothesis, there are studies which show that the EI of children from rural areas is lower than EI of children from urban areas (Herrera et al., 2015), as well

as those showing that students' stress (which is related to their TEI) is higher in students from urban areas in comparison to students coming from rural areas (Shi et al., 2022). Also, some studies show that TEI measures perform differently and have different meanings for collectivistic and individualistic societies (Feher, 2019), which is important for moving forward with cross-cultural comparisons of TEI. Finally, we should bear in mind that parents of both sexes participated in the study conducted in India, while only mothers participated in our research. As the findings of previous studies indicate that females seem to manage their emotions better than males (e.g. Brackett et al., 2004; Craig et al., 2009; Hall & Mast, 2008; Petrides & Furnham, 2000; Schutte et al., 2002) and that fathers of children with ASD are more likely to exhibit autistic-like traits than mothers (Bishop et al., 2008; Hurley et al., 2006; Ruser et al., 2007), perhaps we can assume that the TEI differences appear due to the differences in sample structures.

Additional inspection revealed that mothers of children with ASD obtained higher scores on Stress management and lower scores on Assertiveness than mothers from the control group. As ASD caregivers are exposed to high stress levels over a long period of time needed for the process of diagnosing, treating and educating their children (Machado Junior et al, 2014; Whitehead et al., 2015), they most likely eventually develop mechanisms and coping strategies which help them handle pressure and regulate stress effectively (Petrides, 2010). Some authors (Nelis et al., 2009) demonstrated that EI can be acquired and improved. More specificaly, as parents of children with ASD are constantly confronted with a child`s world which is different from their own, it leads them to consequently develop specific emotional skills. Therefore, some EI skills might be strategies developed by mothers to cope with the challenges of having a child with ASD (Manicacci et al., 2019).

However, raising a child with ASD is full of challenges-their caregivers have difficulties in setting boundaries and saying 'no', so they often end up doing things unwillingly (Petrides, 2010). This learned helplessness consequently leads to a lack of initiative, reduced persistence, and avoidance of contacts (Tomić et al., 2011). Social isolation due to stigmatization and

rejection by society (Benderix et al., 2007; Gray, 2002) probably also contributes to their reduced willingness to stand up for their rights, so caregivers tend to backdown even if they know they are right (Petrides, 2010).

Maternal level of education has a significant effect on their TEI, even if the child's status is controlled. Our results show similarity to those who posed that TEI is positively associated to the level od education (Pérez-Díaz et al., 2021). Although parental education is not directly related to the increased incidence of ASD (in terms that less educated parents are not at a greater risk of having a child with ASD) (King & Bearman, 2011; Rai et al., 2012), parents of lower SES are more focused on meeting the child's basic and material needs (Brezis et al., 2015) and have less information about professional support services (Pickard & Ingersoll, 2016). More educated individuals with higher incomes can be more committed to their parenting roles and interacting with the child (Brezis et al., 2015), so they seek professional help earlier-their children get examined by experts more regularly, and diagnosed at a younger age (Thomas et al., 2011), so they probably have a higher sense of emotional self-efficacy. Also, taking into account the fact that TEI is positively associated with academic performance (Perera & DiGiacomo, 2013; Petrides et al., 2004), and therefore probably with academic intelligence too, we can assume that more educated ASD mothers probably show a higher capacity to recognize the child's problem, understand their life situation and use their problem-solving abilities. Therefore, their sense of perceived emotional self-efficacy is probably higher than in mothers with lower education.

Maternal TEI is not related to their age, which is contradictory to other research conducted in our study (Jolić Marjanović & Altaras Dimitrijević, 2014), but complementary to the findings of the authors indicating that there is no association between TEI and age (Pérez-Díaz et al., 2021). The obtained results can be explained by the sample`s selectivity. The fact that this study included mothers who included their children in treatment and took steps towards problem-solving, probably speaks of a generally higher perceived emotional self-efficacy. Also, the obtained results can speak in favor of the hypothesis

that EI components may develop over time with age or life changes (Palmer et al., 2003). That is, one gets the impression that age itself does not contribute to TEI, but rather the experiences that individuals face during their lifetime.

Parents of older children with ASD score lower on Well-being and Optimism-they have low self-regard and self-esteem and are generally pessimistic, disappointed about their life as it is, and not inclined to "look at things from the positive side" (Petrides, 2010). Obtained results are not surprising, considering the increasing parental stress as the ASD child grows older (Milačić Vidojević, 2008) because of the anxiety regarding the child's ability to fulfill the next developmental and educational tasks (Connolly, 2015), parental increased burnout and awareness of the permanence of child`s difficulties, as well as a general lack of system and professional support for older children and adults with ASD in our country (Gosto, 2016; Milačić Vidojević, 2008).

The study limitation is the sample size and the fact that only mothers participated in the study, so no conclusions on gender differences in terms of parental TEI could be made. The fact that mothers from our sample come from urban settlements, have at least high school education, and were able to perceive the child's difficulties and included them in treatment, already speaks of a pre-selected sample and higher levels of perceived emotional self-efficacy. Therefore, future studies should include parents whose children do not receive treatment and/or grow up in slightly different socioeconomic conditions.

Conclusion

Having a child with ASD affects parental perceived emotional self-efficacy. However, as certain sociodemographic factors also play a role, further studies are needed to examine the effect of other mediator and moderator variables on TEI of parents of children with ASD, as well as those aimed at monitoring the dynamics of development and changes in TEI at

different time points. Focused programs aimed at minimizing or decreasing negative outcomes for caregivers of persons with ASD are needed.

Data availability statement

Data files are available upon a reasonable request.

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Research Article

The relationship between physical activity and mental health: Is more always better?

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ABSTRACT

The current study was designed to examine the relationship between physical activity and mental health. We investigated whether individuals who perceive themselves as physically inactive, recreationists, or active athletes differ in positive (positive affect, subjective well-being, unconditional self-acceptance) and negative mental health outcomes (depression, anxiety, stress, negative affect, conditional self-acceptance). Furthermore, we investigated whether the total level of leisure-time physical activity predicted different mental health indicators. Analysis revealed that physically active respondents (recreationists and active athletes) seem to have better overall mental health status than physically inactive ones. Precisely, physically inactive individuals scored higher on all measures of negative mental health indicators, and lower on all measures of positive mental health indicators, compared with the participants from the two other groups. At the same time, there were no significant differences in these measures between recreationists and active athletes. Besides, a positive association was found between the weekly frequency of leisure-time activity and only two positive indicators of mental health (positive affect and subjective well-being)of all tested. The obtained results suggest that it is often more relevant for mental health whether someone is physically active or not, in general, than how frequently they exercise.

Keywords: physical activity, leisure-time activity, mental health, positive affect, negative affect

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Introduction

In professional sports and psychological literature, the benefits of physical exercise on mental health have become a common research topic, with numerous studies confirming this relationship (e.g., Lubans et al., 2016; Schuch & Vancampfort, 2021). In most of these studies, physical activity is defined as "any bodily movement produced by skeletal muscles that result in energy expenditure" (Caspersen et al., 1985, p. 126), whereas the definition of physical exercise is "a specific type of physical activity that is planned, structured and repeatedly done to improve or maintain physical fitness" (Caspersen et al., 1985, p. 126). Although these terms are often explored interchangeably, physical exercise is a narrower term. Considering that, in this paper will be used a broader term, i.e., physical activity, in order to assess the way in which any physical activity, not only planned, structured and repeated, is related to mental health.

When it comes to mental health, it also seems that more precise terminology should be used when the study results regarding physical activity and mental health are communicated to a broader audience. By stating that doing sports is "good for our mental health" we neither imply only the absence of pathology nor that this relationship is unequivocal and straightforward as it seems. Namely, the construct of mental health is not equated with the absence of psychological problems and/or symptoms, but its definition also includes the presence of positive indicators of psychological functioning (Jahoda, 1958; Seligman & Csikszentmihalyi, 2000). Huppert and Whittington (2003) agree with this, suggesting that positive mental states are not the same as the absence of psychological symptomatology. In line with this conclusion are also the findings that positive and negative affect are related but separate dimensions of affectivity (e.g., Clark & Watson, 1991; Diener et al., 1985). Contemporary definitions of mental health include numerous aspects of a person's functioning, such as overcoming stress, achieving the desired productivity and, realizing one's potential, making a positive contribution to the social community (WHO, 2020). For that reason,

researchers typically pose the question of whether being physically active to some extent can, on one hand, foster its positive indicators (e.g., psychological well-being [Buecker et al., 2021; Jenkins et al., 2021; Lawton et al., 2017], positive affect [Maher et al., 2021], self-efficacy [Craft & Perna, 2004], self-esteem [Schmalz et al., 2007; Zamani Sani et al., 2016]) and, on the other hand, diminish negative ones (e.g., anxiety [Batallio et al., 2020; Stubbs et al., 2017] and depression [Batallio et al., 2020; Morres et al., 2019]). However, this is rarely done within the same study.

During the acute COVID-19 world crisis, physical exercise was recommended as part of mental health protection strategies (Jacob et al., 2020; Marconcin et al., 2022), and it turned out to be an adaptive strategy in overcoming stress caused by this crisis (Popov et al., 2021). Also, it was found that physical exercise is positively associated with stress reduction in the student population (Moeller et al., 2020). The way a person perceives their value is also one of the indicators of mental health that is often tested in relationship with physical exercise (e.g., Zamani Sani et al., 2016). For example, one study claims that aerobic exercise increases self-esteem (Mousavi Gilani & Dashipour, 2017). According to some authors, physical exercise has a preventive function (Chekroud et al., 2018) or is used as an additional activity (i.e., intervention) in treating disordered states (Rosenbaum et al., 2014; Zschucke et al., 2013). One gets the impression that physical exercise is a "vaccine" that protects mental health, but this does not mean that all physical activities are equally beneficial, nor that people who exercise more (e.g., athletes) are necessarily mentally healthier than those who exercise less (Rice et al., 2016). For instance, there are study results that are suggestive of the harmful effects that overtraining and staleness have on mental health (e.g., Peluso & Guerra de Andrade, 2005; Tobar, 2005). White and colleagues (White et al., 2017) conducted a meta-analysis that revealed that the effects that physical activity has on mental health depend on the life domain in which physical activity occurs. According to their study, leisure-time physical activity produces the clearest and most consistent positive effects on mental health (unlike household physical activity, transport-related physical activity, and physical education).

Given that there are, to some extent, inconsistent findings regarding the effects that physical activity produces, researchers should focus on different specificities of physical activity (e.g., type, frequency, duration, intensity) that could potentially lead to divergent mental health outcomes. In this regard, the current study aims to investigate whether different levels and frequencies of physical activity could enrich positive mental health in different ways.

What is the right dose of physical activity to preserve mental health?

Is all physical activity beneficial for mental health? Does a higher intensity, duration or frequency of physical activity necessarily mean better mental health? Research on the connection between cognitive functioning and physical exercise mainly emphasizes the benefit of recreational exercise, which differs in specificities of physical activity from the rigorous training of elite and professional athletes (e.g., Moore et al., 2012; Pennington & Hanna, 2013). Many studies find that moderate intensity of physical exercise is the most effective regarding psychological well-being (e.g., Netz et al., 2005; Wicker & Frick, 2015). However, research that investigated the relationship between physical exercise and mental health is inconsistent in its results. For example, according to some studies, vigorous physical exercise achieves the best benefit for the well-being of adolescents (Costigan et al., 2019), as well as a lower state of anxiety compared to light and moderate activity (Frontini et al., 2021). This may be because the types of sports and activities the respondents practiced (e.g., running and shooting) are not distinguished, but also because researchers frequently do not make a distinction between those who play sports recreationally and those who play sports professionally (Sokić et al., 2021). Similarly, earlier studies differ in terms of the mental health criteria they use, which makes study findings difficult to compare, but it also possibly leads to inconsistent results. One study shows that semi-professional athletes use more constructive emotional regulation strategies than

amateurs (Shirvani et al., 2015). On the other hand, given the greater possibility of injury, overtraining, and stressors that come from performance demands, it can be assumed that elite and professional athletes are more susceptible to psychopathology compared to the general recreational population (Reardon & Factor, 2010). Some authors (Peluso & Andrade, 2005) speculate that the positive effects of physical exercise on mental health that are widely discussed are experienced by respondents who engage in recreational sports, compared to a sedentary lifestyle, while this is not necessarily the case when it comes to elite and professional athletes (due to the abovementioned risks of this profession).

The current study aims to examine the relationship between physical activity and mental health. More specifically, we want to examine whether individuals who perceive themselves as physically inactive, recreationists, or active athletes differ in mental health outcomes (both positive and negative). Also, we are interested in whether total level of leisure-time physical activity (that includes light, moderate, and strenuous exercise) predict different mental health indicators. Given that age may affect the total level of weekly physical activity (Suryadinata et al., 2020; Varma et al., 2017), as well as mental health variables (Carstensen et al., 2020; Han et al., 2019; Lorem et al., 2017; Sun & Sauter, 2021), we will use it as a control variable.

Method

Participants and Procedure

The total sample in the research consisted of 939 respondents from the general population in Serbia (67.1% female), 18–75 years old ($M = 26.57$, $SD = 10.18$). Despite the large age range, young people predominated in the sample (Mode = 20; a histogram with age distribution among praticipants is given in Appendix A). The data was collected online between March and May 2022 using the Google form platform. Since we collected data online, the pool of potential study participants was restricted to social networks sites users (i.e., Facebook). The survey link was administered with the help of students who were rewarded with additional points during the exam period. All individuals ≥ 18 years

old were eligible to participate in the study.Before filling out the survey, participants consented to participate in this research study.

Instruments and variables

The Godin Leisure-Time Exercise Questionnaire (GLTEQ)

The Godin Leisure-Time Exercise Questionnaire (GLTEQ); Godin, 2011; Serbian adaptation by Popov et al., 2021) refers to a weekly physical activity self-assessment. Physical activity is defined as the weekly frequency of physical activity that lasts at least 15 minutes and refers to the week preceding the examination. Based on the answers, three categories of physical activity can be distinguished: light (e.g., yoga, easy walking, and archery), moderate (e.g., fast walking, easy bicycling, and tennis), and strenuous (e.g., running, squash, and roller skating). The weekly activity frequencies are multiplied by appropriate metabolic equivalents to obtain the total leisure activity score ([Strenuous x 9] + [Moderate x 5] + [Light x3]; Godin, 2011).

Self-assessment of Physical Activity

Along with the GLTEQ, we asked the participants whether they consider themselves physically inactive, recreationists, or active athletes.

The Depression, Anxiety, Stress Scale (DASS-21)

The Depression, Anxiety, Stress Scale (DASS-21; Lovibond & Lovibond, 1995; translation into the Serbian language is available on the official website[1]) is used for measuring mental health indicators: Depression scale assesses the degree of dysphoria, hopelessness, anhedonia, negative self-view and passivity (α = .90, 7 items, e.g. *I felt that life was meaningless*); Anxiety scale refers to the subjective feeling of situational trepidation, muscle tension and autonomic arousal (α = .90, 7 items, e.g. *I felt I was close to panic*); Stress scale measures nervous arousal, relaxing difficulties, easy agitation and irritability (α = .88, 7 items, , e.g. *I found it difficult to relax*). The respondent should choose the answer that

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[1] http://www2.psy.unsw.edu.au/dass/Serbian/DASS-SER.pdf

best describes how he/she felt during the previous two weeks using the 4–point Likert scale (0 – *did not apply to me at all*; 3 – *applied to me very much or most of the time*).

Serbian Inventory of Affect based on the Positive and Negative Affect Schedule-X (SIAB-PANAS)

Serbian Inventory of Affect based on the Positive and Negative Affect Schedule-X (SIAB-PANAS; Mihić et al., 2010) is a Serbian adaptation of PANAS-X (Watson & Clark, 1994). We used a short version of the 20-items questionnaire to assess dispositional positive (PA; α = .87, 10 items, *e.g. excited, attentive, enthusiastic*) and negative affectivity (NA; α = .90, 10 items, *e.g. distressed, irritable, afraid*). The responses are collected using the 5–point Liker scale (1 – *almost none or not at all*, 5 – *extremely*).

The Short Subjective Well-Being Scale (SWBS)

The Short Subjective Well-Being Scale (SWBS; Jovanović, 2010) measures participants' subjective well-being (SWB) through 8 items related to the positive evaluation of life and pleasant emotions (α = .93, e.g. *It is wonderful to be alive*). The responses are collected using the 5–point Liker scale (0 –strongly disagree, 5 – strongly agree).

The Unconditional Self-Acceptance Questionnaire-short scale (USAQ)

The Unconditional Self-Acceptance Questionnaire-short scale (USAQ-short scale; Popov & Sokić, 2022) is a Serbian adaptation of USAQ by Chamberlain and Haaga (2001). The USAQ-short scale consists of 10 items that refer to various aspects of unconditional (4 items) and conditional self-acceptance (6 items). We used scores from the two subscales: Conditional self-acceptance (CSA; α =.90, e.g. *When I am criticized or when I fail at something, I feel less worthy as a person*) and Unconditional self-acceptance (USA; α = .80, e.g. *I feel worthwhile even if I am not successful in meeting certain goals that are important to me*). Responses are collected using the 7–point Likert scale (1 –almost always untrue, 7 – almost always true).

Results

The data were analyzed using an open-source statistical software JASP (Version 0.16.4; JASP Team, 2022). The descriptive statistics for continuous variables used in the research are shown in Table 1. According to values of skewness and kurtosis, the distribution of scale scores does not significantly deviate from normality(skewness < ±2 and kurtosis < ±7; Hair et al., 2010).

Table 1
Descriptive statistics for continual variables in the study

	Theoretical range	Empirical range	*M*	*SD*	*Skewness*	*Kurtosis*
Leisure Activity(GLTEQ)	0-119	0-119	33.63	26.69	1.13	1.07
Depression (DASS-21)	0-21	0-21	5.46	5.54	0.96	-0.03
Anxiety (DASS-21)	0-21	0-21	5.98	5.85	0.81	-0.42
Stress (DASS-21)	0-21	0-21	9.66	5.78	0.20	-0.88
Positive Affect (SIAB-PANAS)	10-50	13-50	38.14	7.18	-0.47	-0.14
Negative Affect (SIAB-PANAS)	10-50	10-50	22.87	8.83	0.79	-0.05
Subjective Wellbeing (SWBS)	8-40	8-40	33.50	6.39	-1.00	0.60
Conditional Self-Acceptance (USAQ-short)	6-42	6-42	17.67	9.25	0.67	-0.42
Unconditional Self-Acceptance (USAQ-short)	4-28	4-28	21.59	5.29	-0.72	-0.04

Intercorrelations among variables are shown in Table 2. All correlations are in the theoretically expected direction.The DASS-21 subscales (depression, anxiety, and stress) correlate positively and very highly with each other. Positive affect moderately and negatively correlates with all three DASS-21 subscales, while a higher positive correlation exists between NA and DASS-21 subscales. Also, there is a negative but moderate correlation between PA and NA. Subjective well-being achieves a high positive correlation with PA, while the correlations with DASS-21 subscales and NA are moderate and negative. Conditional self-acceptance (CSA) moderately and positively correlates with all

three DASS-21 subscales, and NA negatively correlates with SWB and PA. Unconditional self-acceptance (USA) achieves the opposite tendencies to conditional self-acceptance. The correlations of leisure activity score (GLTEQ) with mental health variables are particularly interesting. The total leisure activity score correlates statistically significantly only with the PA and SWB. These correlations are positively directed but low.

Table 2

Intercorrelations among the variables

		1	2	3	4	5	6	7	8	9
1	Age	-								
2	Depression	-.176**	-							
3	Anxiety	-.174**	.803**	-						
4	Stress	-.156**	.728**	.768**	-					
5	PA	.124**	-.416**	-.296**	-.336**	-				
6	NA	-.136**	.675**	.648**	.657**	-.352**	-			
7	SWB	.053	-.509**	-.392**	-.402**	.706**	-.465**	-		
8	CSA	-.183**	.617**	.532**	.521**	-.422**	.632**	-.406**	-	
9	USA	.181**	-.391**	-.342**	-.294**	.465**	-.394**	.427**	-.510**	-
10	Leisure-time Activity	-.137**	-.053	-.050	-.050	.214**	-.042	.145**	-.043	.045

Note. PA – Positive Affect. NA – Negative Affect. SWB – Subjective Wellbeing. CSA – Conditional Self-Acceptance. USA – Unconditional Self-Acceptance. *p<. 01. **p<. 01.

In order to test the differences in mental health indicators between three categories of respondents according to the level of physical activity (physically inactive, recreational athletes and active athletes), we conducted a one-way analysis of variance. The results revealed small but statistically significant between-groups effects in case of all dependent variables (depression, anxiety, stress, PA, NA, SWB, USA, and CSA; Table 3). Because homogeneity of variances assumption was not met in all models except in those where PA and stress were used as dependent variables, as well as because compared groups were not equal in size, Games-Howell post-hoc test was used (Games & Howell, 1976) and the p values are corrected using Tukey method.

Games-Howell test for multiple comparisons found that physically inactive respondents reported significantly higher scores on negative indicators

of mental health compared to recreational athletes; namely, higher anxiety (M_{dif} = 1.81, 95% CI [0.77, 2.85], p < .001), higher depression (M_{dif} = 1.75, 95% CI [0.78, 2.74], p < .001), higher stress (M_{dif} = 1.51, 95% CI [0.50, 2.54], p = .001), higher NA (M_{dif} = 2.26, 95% CI [0.68, 3.83], p = .002), and higher CSA (M_{dif} = 2.79, 95% CI [1.15, 4.44], p < .001). Physically inactive respondents also reported significantly more pronounced symptoms compared to professional athletes: higher anxiety (M_{dif} = 2.43, 95% CI [1.11, 3.75], p < .001), higher depression (M_{dif} = 2.30, 95% CI [1.05, 3.56], p < .001), higher stress (M_{dif} = 1.74, 95% CI [0.37, 3.11], p = .008), higher NA (M_{dif} = 3.43, 95% CI [1.43, 5.42], p < .001), and higher CSA (M_{dif} = 3.81, 95% CI [1.69, 5.93], p = .002). At the same time, recreational athletes and professional athletes did not significantly differ in any of these negative indicators of mental health.

When it comes to positive indicators of mental health, physically inactive individuals had significantly lower PA (M_{dif} = -3.94, 95% CI [-5.17, -2.70], p < .001), lower SWB (M_{dif} = -2.23, 95% CI [-3.32, -1.14], p < .001), and lower USA (M_{dif} = -1.72, 95% CI [-2.65, -0.78], p < .001) compared to recreational athletes. They also scored significantly lower on PA (M_{dif} = -5.64, 95% CI [-7.19, -4.10], p < .001), on SWB (M_{dif} = -3.34, 95% CI [-4.74, -1.94], p < .001) and USA (M_{dif} = -1.33, 95% CI [-2.61, -0.05], p = .039) compared to professional athletes. In addition, comparison of recreational and professional athletes implied that these two groups do not differ in terms of SWB and USA, but that they differ in PA in a way that professional athletes reported higher scores on PA than recreational athletes (M_{dif} = -1.71, 95% CI [-3.09, -0.32], p = .011).[2]

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[2] It is worth noting that even when Bonferroni post hoc test is applied (which is more conservative test than Games-Howell test), detected between-groups differences remain the same.

Table 3

The difference in mental health variables due to level of physical activity

Groups: 0:inactive (*n*= 293) 1: recreationists (*n*= 490) 2: active athletes (*n*= 156)		*F* *(df=2,936;* *p<.001)*	ω²	Games- Howell post-hoc test
	M (SD)			
Depression	0:6.76 (5.90) 1:5.01 (5.33) 2:4.46 (5.08)	12.55	.024	0>1,2
Anxiety	0:7.33 (6.23) 1:5.52 (5.64) 2:4.90 (5.32)	12.27	.023	0>1,2
Stress	0:10.75 (8.09) 1:9.22 (5.51) 2:9.01 (5.76)	7.69	.014	0>1,2
Positive Affect	0: 35.15 (7.27) 1: 39.08 (6.82) 2: 40.79 (6.25)	43.92	.084	2>0,1; 1>0
Negative Affect	0: 24.62 (9.37) 1: 22.36 (8.55) 2: 21.19 (8.08)	9.59	.018	0>1,2
Subjective Wellbeing	0: 31.77 (6.60) 1: 34.01 (6.26) 2: 35.12 (5.66)	17.86	.035	0<1,2
Conditional Self-Acceptance	0: 19.76 (9.79) 1: 16.97 (8.88) 2: 15.96 (8.69)	11.85	.023	0 > 1,2
Unconditional Self-Acceptance	0:20.47 (5.65) 1:22.19 (4.92) 2:21.81 (5.40)	10.00	.019	0<1,2

Note. Values for partial ω² of value .01 indicate small effect, .06 indicate medium effect, and .14 indicate large effect (Field, 2013).

For testing how total leisure-time activity predicts mental health outcomes, we conducted two hierarchical regression analysis. Given that total leisure-time activity score correlates only with the SWB and PA, these two positive mental health indicators were used as criterion variables.It

should be noted that these correlations, although significant, were small.In both regression models age was entered in the first step to control for its effects. The total leisure-time activity, after controling for the age of the respondents, positively predicted PA, $F_{(2, 936)}$=35.13, R^2=.07, β=.24, p<.001, and the SWB, $F_{(2, 936)}$=12.80, R^2=.03, β=.17, p<.001. In the first tested model, age positively predicted PA even after including total leisure-time activity score, β=.16, p<.001. In the second model, age was not a significant predictor of the SWB when entered in the initial step. However, it appeared to be a significant predictor of the SWB after including the total leisure activity score, β=.08, p=.022. Nevertheless, all calculated effects were small, and very small percent of variance of the criteria was explained by independent variables.

Discussion

This study aimed to examine the relationship between the level and frequency of physical activity and different positive and negative mental health indicators in the general population. The level of physical activity was defined through the respondents' self-assessment of whether they perceive themselves as physically inactive, recreationists, or active athletes. The frequency of physical activity was operationalized through a composite score calculated based on the weekly frequency of light, moderate, and strenuous leisure-time physical exercise. Depression, anxiety, stress, NA, and CSA scores were used as negative indicators of mental health, while PA, SWB, and USA were used as positive indicators of mental health.

First, we tested whether there are differences in the abovementioned mental health outcomes between physically inactive, recreationists, and active athletes. In line with the theoretical expectations and the results of some previous studies, physically active respondents seem to have better overall mental health status than physically inactive ones. Precisely, participants from the group of physically inactive individuals scored higher on all measures of negative indicators of mental health (depression, anxiety, stress, NA, and CSA), compared with the participants from the two other groups. At the same time, there were no significant differences in these

measures between recreationists and active athletes. Although the effect size of the obtained differences is small, this result was consistently found in studies conducted before and during the COVID-19 crisis in different countries, including Serbia (e.g., Chekroud et al., 2018; Jacob et al., 2020; Popov et al., 2021). One of the explanations for this finding in earlier studies was that physical activity can be understood as a strategy for overcoming stress (i.e., distress reduction) and thus contributes to better outcomes regarding the mentioned mental health indicators. The cross-sectional nature of the current study limits us in conclusions about whether physical activity serves as a protective factor, a strategy that helps people to reduce distress, or simply individuals with acute disordered states less frequently engage in physical activities. However, some longitudinal studies provide us with evidence that (moderate and strenuous) physical activity preceded decrease in symptoms of anxiety and depresson(Battalio et al., 2020). Nevertheless, the effect size for the obtained differences between the groups is small for all variables except for dispositional positive affectivity, where the effect size is medium. Considering these results, physical activity cannot be unambiguously interpreted as a protective factor regarding negative mental health indicators. The reasons for such a small effect size can be methodological. This research did not consider individual differences and temporal and systemic factors that may influence the relationship between physical activity and mental health. When it comes to individual differences in the impact of physical activity on mental health, what may help one person may not help another (Wilson & Rhodes, 2021). Also, the effects of physical activity on mental health can be short-term and temporary. Exercise may only provide immediate relief, but symptoms may return (Paluska & Schwenk, 2000). Also, we assume that the overall impact of physical activity on mental health depends on other factors essential for the individual's functioning, such as social support or quality of social relationships. Physical activity is only one of the factors that can contribute to a comprehensive approach to reducing negative emotionality. The critical question is the respondent's motivation for physical activity. Is it more focused on maintaining physical health and appearance or improving mental health? People more prone to negative

affectivity, as well as a higher degree of anxiety and depression, may not be motivated to exercise.

When it comes to positive indicators of mental health, physically inactive respondents reported significantly lower SWB, PA, and USA than physically active respondents (both recreationists and active athletes). Although the relationship between physical activity and positive mental health indicators has yet to be investigated, a recent meta-analytic study (Buecker et al., 2021) suggested a significant association between SWB and physical activity (this association was found in crossectional, experimental, and quasi-experimental studies). Buecker and colleagues alsohave found that physical activity is more related to PA (as a subdomain of SWB) than to the cognitive aspect of SWB (Buecker et al., 2021). It is interesting to emphasize that there are no differences between the groups of recreationists and active athletes in any mental health indicator assessed in this study, except in PA. Considering the PA, active athletes reported the highest PA, while physically inactive respondents scored the lowest. This finding is in line with the results presented in earlier studies (e.g., Cameron et al., 2018; Maher et al., 2021; Pasco et al., 2011). For example, Maher and colleagues (Maher et al., 2021) reported that physical activity fostered PA during the COVID-19 curfew. In addition, limited experimental findings suggested that experimentally induced PA"could be a promising strategy to promote the pursuit of physical activity goals" (Cameron et al., 2018, p. 13). Thus, it seems that the relationship between PA and physical activity is bidirectional.However, before assuming that an increase in physical activity is followed by linear growth of PA, one should address the question of whether active athletes practice more intense physical activity than recreationists by default. In addition, given that our sample is comprised of people from the general population, we do not know whether those participants who perceive themselves as active athletes are professional athletes (yet this information would help us to make stronger assumptions regarding the difference in intensity of physical activity between those who consider themselves a recreationist and athletes). Our study findings contradict the study findings of those who reported the existence of

a negative association between practicing more intense and strenuous physical activity and PA (e.g., Hall et al., 2002). This is also visible from the positive association that we found between the weekly frequency of leisure-time activity and PA (knowing that strenuous activity has the highest ponder in the composite score calculated from the GLTEQ).We also have found a positive association between the weekly frequency of leisure-time activity and SWB which is also in line with earlier studies. For example, a recent longitudinal study confirmed that four weeks of regular physical activity in a sample from the general population aged 18–64 contributed to higher overall subjective well-being, regardless of the sample's demographic characteristics (Iwon et al., 2021). However, it is of particular interest that the weekly frequency of leisure-time activity did not correlate with any other indicator of mental health except with PA and SWB. It might be that the frequency of participating in physical activities does not play an essential role in the context of most mental health indicators measured in this study. It appears more important whether one is being physically active or not, in general, regardless of the recurrence of the activities.

The present study also has some limitations, the first of which is the usage of self-report questionnaires. While commonly used in physical activity research, self-report questionnaires are associated with recall bias (Schuch et al., 2018). We collected data on the subjects' physical activity via self-assessment, while more objective measuring instruments (e.g., pedometer, pulsometer) were not used. Ideally, physical activity would be measured by both subjective and objective instruments, to make conclusions about the potential discrepancy between these measures. However, no such data were available in the present study. Another limitation of our study stems from the fact that we did not administer our questionnaires in a randomized order. This seems to be important given that one group of researchers tested whether the order of the questionnaires influenced the results in a way that more physically active respondents tended to report more happiness and SWB (Kaczmarek et al., 2021). Namely, they examined whether there is a focusing illusion if the respondents were asked about physical activity first and then about SWB. They found that respondents with moderate physical activity did

report a higher level of SWB when they were asked about their physical activity first, but not the other way around. The question remains whether a similar illusion occurred in our research, considering the order in which the questionnaires were administered.

The obtained results in our study suggest that there are group differences in terms of CSA and USA. Namely, physically inactive respondents reported higher levels of CSA and lower levels of USA compared with the recreationists and active athletes. These are novel findings if we take into account that, to our knowledge, the concepts of CSA and USA have not been tested previously in the context of physical activity. Nowadays a lot of pressure is put on people because society requires that we invest in self-care in various ways – a healthy diet and physical exerciseare frequently on that list. One possible interpretation of our results could be that physically inactive people feel less worthy and successful if they fail to achieve these social standards. However, to investigate this more thoroughly, we should also ask the respondents how they feel about the fact that they are physically inactive. Another potential understanding of the beforementioned study results can be found in the Exercise and self-esteem model (EXSEM; Sonstroem et al., 1994). According to the EXSEM, being physically active can lead to greater perceived self-efficacy, further contributing to self-esteem. Considering conceptual overlaps between self-esteem, USA, and CSA, it could be that the interplay between physical activity, USA, and CSA can be explained via the same mechanisms. Yet, we need more research to further test this assumptionby including the measure of self-efficacy and asking participants to evaluate their self-worth in the context of physical activity instead of asking them to focus on conditional or unconditional acceptance of themselves as a person in general. Finally, it could be that those who are physically inactive avoid physical exercising because that way they want to avoid receiving feedback about their performance (if receiving negative feedback would make them feel less worthy). Although novel and interesting, it seems our finding regarding the relationship between physical activity, CSA, and USA could be better understood by including additional variables.

Aside from evaluating positive and negative indicators of mental health in the context of physical activity, another strength of the present study comes from using a large sample of adult respondents from the general population. The link between physical activity and mental health indicators is evident, although the impact of physical activity on mental health in this study is small. However, further longitudinal and experimental studies are needed to understand the complexity of this relationship. We can find another valuable aspect of our research in using two different measures of physical activity: one based on the self-assessment of the level of physical activity and the other one that indicates the frequency of practicing different light, moderate, and strenuous exercise. Different patterns of results obtained for these two measures imply the importance of how physical activity is operationalized in studies, suggesting that using divergent instruments across studies can be partly responsible for inconsistent research findings. Moreover, it is debatable how accurate people are when they need to assess to what extent they are being physically active. For instance, some people may consider themselves physically inactive because they do not play any sport, neglecting other daily activities such as walking, cycling, household chores, etc. Finally, more information about the intensity of practiced physical activities is needed, given that even recreational activities can demand great physical effort. In contrast, different sports can require different physical effort (e.g., aerobic consumption), meaning that it is possible that some activities practiced recreationally are more physically challenging compared to some sports people actively play.

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Conflict of interest

We have no conflicts of interest to disclose.

Data availability statement

Data files are available upon a reasonable request.

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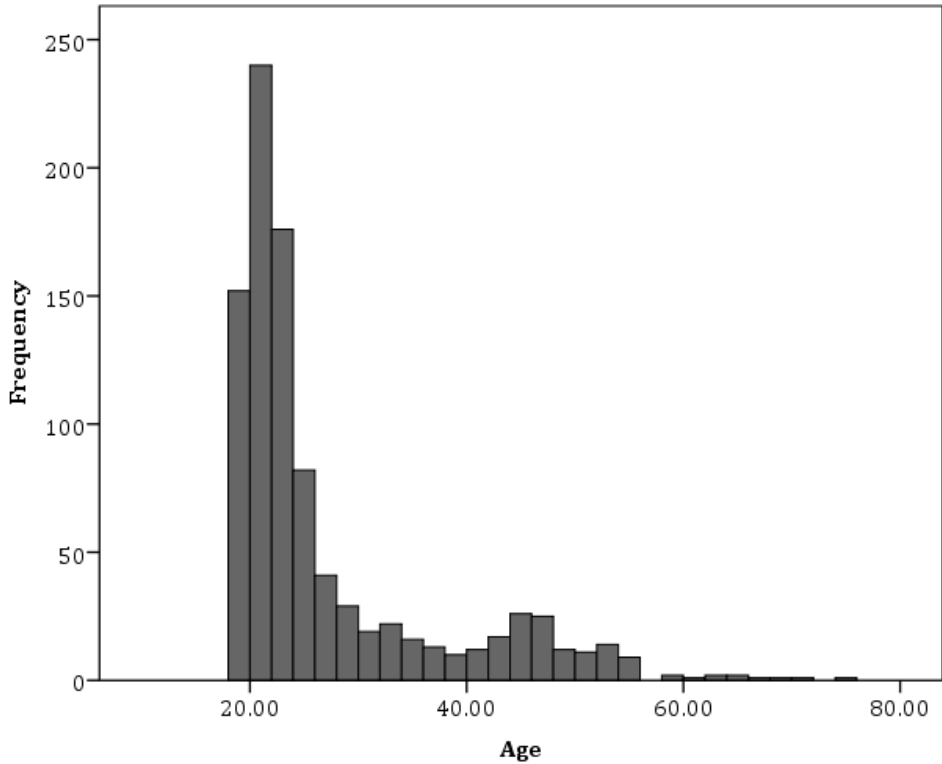
Appendix A

Figure 1. Age distribution among study participants
Note. *M* = 26.57, *SD* = 10.18, *Mode* = 20

Research Article

Inferiority and Superiority Complex: Examination in Terms of Gender, Birth Order and Psychological Symptoms

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ABSTRACT

Inferiority and superiority complex are personality structures that point to unhealthy development in Adlerian theory. In this study, the aim was to examine inferiority and superiority complex in terms of socio-demographic characteristics of adult individuals, and to determine the predictive relationships between psychological symptoms and inferiority and superiority complex. A total of 361 (205 females, 156 males) adults between the ages of 18 and 62, reached through the convenient sampling method, participated in the study. Data were collected through the Turkish Version of the Adlerian Inferiority and Superiority Complex Shortened Scales, the Symptom Check List, and the Personal Information Form. In the study, it was found that the main effects of gender and birth order were significant in inferiority complex, while the main effect of birth order was significant in superiority complex. Gender main effect for superiority complex and gender-birth order interaction effect for both complexes were not significant. In addition, it was determined that psychological symptoms were a significant predictor of inferiority complex, but not a significant predictor of superiority complex.

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Introduction

Personality development has attracted the attention of many researchers from past to present, and different theories have been proposed on this subject (Freud, 1960; Jung, 1966; McCrae & Costa, 2008). The feeling of inadequacy is at the centre of Adlerian approach, which is one of the personality theories. According to Adler, the feeling of inadequacy is the basis of being human (Adler, 1932) and this feeling results from the fact that individuals live a life dependent on others when they are born (Adler, 1952). The process of overcoming this sense of inadequacy felt by the individual also represents the development process of the individual's personality. Adler (1952; 1956) explains the healthy way of coping with the individual's feeling of inadequacy through the effort of superiority; however, not every individual can overcome this emotion in healthy ways. In this case, the individual develops inferiority complex and/or superiority complex. Both complexes are based on individuals' comparing themselves with others (Adler, 1952; Dean, 1930; Wright, 1925) and indicate that the individual does not have the ability to solve a problem on the basis of social benefits (Adler, 1964).

Inferiority complex is an intense and deep feeling of inadequacy that individuals experience in relation to perceiving others as more competent than themselves and not feeling ready to overcome a problem (Adler, 1964). This complex prevents the expression and development of the existing potential (Mishra, 2018). It causes individuals to become discouraged, to be afraid of defeat, and to be inactive in the face of life events. Not having self-confidence, excessive self-limitation, intense fear of failure, the desire to quit something started and avoiding social environments are among the indicators of inferiority complex (Adler, 1952). According to the results of previously conducted studies, inferiority complex is negatively correlated with psychological well-being (Kabir, 2018), while it is positively correlated with various mental health problems (Lee, 2008; Payam & Agdasi, 2017). In this context, inferiority complex should be distinguished from personality constructs such as neuroticism and self-esteem, that correlate with mental health problems (Chan & Cheung, 2022; Priyadhersini et al., 2022; Xia et al.,

2011). Neuroticism provides insight into emotional instability as a personality trait (Costa & McCrea, 1987). Self-esteem mainly includes an overall assessment of the individual's self-worth (Rossenberg, 1965). On the other hand, inferiority complex includes an evaluation of competencies related to whether individuals can overcome any problem.

Superiority complex is an unhealthy way an individual with inferiority complex follows to cope with inferiority complex. In other words, superiority complex is the overcompensation of inferiority complex and basically has the function of hiding inferiority complex (Adler, 1932). Superiority complex develops in individuals who believe that they cannot show themselves on the positive side of life and who are incapable of solving the problems they encounter in effective ways (Adler, 1945; 1956). Individuals try to cope with their inferiority complex by believing that they are more competent/sufficient than others (Adler, 1952). According to Adler (1956), making excessive demands, arrogance and all kinds of behaviours aimed at showing oneself better than others are among the indicators of superiority complex. In addition to these, individuals who experience intense superiority complex are incapable of things like altruistic behaviour, courtesy, and reciprocity in friendships (Darmstadter, 1949). Individuals are often exposed to exclusionary reactions of groups due to these behaviours (Steffenhagen, 1978). It is reported that individuals with superiority complex have an increased tendency to join illegal groups and be cruel to those they manage (Ayim-Aboagye et al., 2018). According to the results of studies conducted, superiority complex is negatively correlated with neuroticism (Čekrlija et al., 2018). In addition, narcissism is the strongest predictor of superiority complex (Čekrlija et al., 2023). In this context, although neuroticism and narcissism are correlated with superiority complex, there are important conceptual differences between them. While the dominant emotions of neurotic individuals are fear, anxiety, helplessness (Costa & McCrea, 1987), the dominant emotions of individuals with high superiority complex are pride, arrogance, anger and hostility (Adler, 1945; 1956). Moreover, considering the

multifactorial nature of narcissism, superiority constitutes one dimension of narcissism (Emmons, 1984; Raskin & Tery, 1988).

In Adlerian theory, besides complexes, another important concept in the development of personality is birth order (Adler, 1952). According to Adler, although siblings are in the same family, their environment is quite different from each other (Adler, 1956) and parental attention may differ according to the birth order of the children (Adler, 1952; Sulloway, 1996). In Adler's view, the first childs, unlike other children, are at the centre of an exaggerated attention for a while without sharing parental love with anyone; however, they are "dethroned" with the birth of the second child. They have to share the attention of their parents with their siblings from the moment middle and last children are born. On the other hand, since there is no other child after the last child, he/she never loses his position in the family and has a good development process compared to other children (Adler, 1952; 1984). Sulloway (2007) states that first- and last-born children are raised with more parental investment than middle children.

Aim of the Present Study

Adlerian theory has not received scientific interest for many years and sufficient empirical evidence has not been provided for this theory (Čekrlija et al., 2017; Darmstadter, 1949); however, in recent years, this approach has begun to attract the researchers'attention. As a matter of fact, in recent years in Turkey, a large number of scales based on Adlerian approach have been developed/adapted (e.g., Akdoğan & Ceyhan, 2014; Güngör & Dillman-Taylor, 2021; Kalkan, 2005; Kalkan, 2009; Üzbe-Atalay, 2019) and various studies have been carried out in this context (Göktaş et al., 2022; Oktan et al., 2014; Uysal-Çelik & Demir, 2021). On the other hand, no study has been found in Turkey on inferiority and superiority complex, which have an important place in Adlerian theory, and which indicate the unhealthy development of personality.

There are a limited number of studies on inferiority and superiority complex in the literature, and these are mostly correlational studies conducted with student groups (e.g., Kabir, 2018; Rokvić, 2020). In the present

study, which also included the adult group, the predictive relationship regarding the complexes was also examined. In the literature, the findings are not consistent in terms of gender (Brier, 2018; Dhara & Barman, 2020; Kabir & Rashid, 2017; Kalavani, 2017; Kolisnyk et al., 2020; Poorana-Nancy, & Dharma-Raja, 2018). At this point, it can be stated that there is a need for new research on the gender variable. In the literature, birth order and inferiority complex have generally been studied in relation to variables such as education level and academic achievement, psychological well-being, and social anxiety (Kabir & Rashid, 2017; Kalavani, 2017; Kim, 2020; Payam & Agdasi, 2017; Venkataraman & Manivannan, 2018). On the other hand, no research has been found in the literature examining the relationship between birth order and complexes, and between psychological symptoms and complexes.

In his explanations of complexes, Adler drew attention to anxiety (Adler, 1964), anger (Adler, 1932; 1956) and depression (Adler, 1952) in terms of psychological symptoms. The nature of interpersonal sensitivity, on the other hand, is associated with the individual's feelings of humiliation and inadequacy (Dag, 1991). For this reason, four psychological symptoms - anxiety, anger, depression, and interpersonal sensitivity- were discussed in the present study. In parallel with the theoretical basis, previous research, and social expectations, it is estimated in the current study in terms of gender that inferiority complex will be higher in females and there will be no difference in the level of superiority complex. It is also expected that the levels of inferiority and superiority complexes will differ in terms of birth order, and psychological symptoms will be a significant predictor of both complexes.

Today, being healthy is defined according to the individual's social and psychological well-being as well as the absence of a physical illness (World Health Organization [WHO], (1989). Therefore, examining psychological symptoms which provide an insight regarding the mental health and well-being levels of individuals will provide a new perspective to literature. Answers to the following questions were sought in the study in line with this purpose.

1. Is there a significant difference between inferiority and superiority complexes of adults with different birth order in terms of their gender?
2. Do psychological symptoms predict inferiority and superiority complexes significantly?

Method

Participants

Participants of the study are 361 adults (205 females, 156 males) between the ages of 18 and 62 (M = 33.96; SD = 10.18). Participants were reached via online platform through convenient sampling. Majority of the participants are women (56.8%). It can be seen that the participants between the ages of 31 and 40 (35.2%) are in the majority. The individuals except the first and last children were classified as the middle child in accordance with the Adlerian theory (Adler, 1952; 1984). Participants coming from families with two children were classified as first-last children. There are no participants who reported being an only child. In this context, it can be stated that the participants (44.3%) who are the middle child of their family are higher in number than the other groups. Majority of the participants (60.7 %) stated that they spent their childhood in a nuclear family. In terms of education level, most of the participants (58.7%) are undergraduate graduates.

Data Collection and Ethical Considerations

The research was conducted with the permission of Sakarya University Social and Human Sciences Ethics Committee (Document number: E-61923333-050.99-122425). Data were collected online via Google Forms. In the application, an Informed Consent Form was presented to the participants and in this form, the individuals were asked whether they volunteered to participate in the research, and those who chose the option "yes" were included in the study. In addition to this, the purpose and importance of the research was explained in the Informed Consent Form, information was given

about the confidentiality of data to ensure that the participants gave sincere answers to the measurement instruments.

Measures

In this study, Turkish Version of the Adlerian Inferiority and Superiority Complex Shortened Scales, (TV-AISC-SS), Symptom Checklist Revised (SCL – 90 R) and Personal Information Form were used as data collection instruments. Information about these measurement instruments is presented below.

Turkish Version of the Adlerian Inferiority and Superiority Complex Shortened Scales (Derin & Şahin, 2023)

The measurement instrument which aimed to measure the level of inferiority and superiority complex was developed by Mitrović (1998 as cited in Čekrlija et al., 2017). Later, a short form of the scales was created by Čekrlija et al. (2017) and its psychometric properties were tested. Inferiority Complex and Superiority Complex Scales Short Form was adapted to Turkish culture by Derin & Şahin (2023). Both scales are based on a five-point rating (1 = *Strongly Disagree* to 5 = *Strongly Agree*). According to the results of convergent validity, Inferiority and Superiority Complex Scales were found to be significantly correlated with Narcissistic Personality Inventory and Rosenberg Self-Esteem Inventory. Cronbach's Alpha coefficient was .89 for the Inferiority Complex Scale and .78 for the Superiority Complex Scale. Temporal stability coefficient of the scales was .88 for the Inferiority Complex Scale and .84 for the Superiority Complex Scale. Inferiority Complex Scale consists of 10 items and can be scored in the range of 10-50, while Superiority Complex Scale consists of 9 items and can be scored in the range of 9-45. An increase in the score obtained from the scale indicates an increase in the level of complexes (Derin & Şahin, 2023). The Cronbach's alpha coefficient calculated with the data of the present study was .89 for Inferiority Complex and .77 for Superiority Complex.

Symptom Checklist Revised (SCL – 90 R) (Dag, 1991)

The scale provides information on the level of psychiatric symptoms of individuals and which areas they cover. The SCL – 90 R, which was developed by Derogatis (1977) using the Hopkins Symptom Check List, was adapted to Turkish culture by Dag (1991). Scoring is carried out by giving a score between 0 and 4 for the selected option for each item. Correlation of SCL – 90 R with MMPI subscales was examined for convergent validity and it was found that it was significantly correlated with all scales. The Cronbach Alpha coefficient of the scale varies between .63 and .84 (Dag, 1991). Within the scope of this study, the Interpersonal Sensitivity, Depression, Anxiety and Anger/Hostility scales in SCL – 90 R were used. In the current study, the Cronbach's alpha coefficient of the scales were found as .85 for Interpersonal Sensitivity, .91 for Depression, .92 for Anxiety and .87 for Anger/Hostility.

Personal Information Form (PIF)

PIF prepared by the researchers includes questions about the variables of gender, age, education level, and birth order.

Data Analysis

Data were analysed in SPSS 25.0 environment. Skewness and kurtosis coefficients were calculated to determine whether the data met the normality assumption. It was determined that the skewness and kurtosis values were between -1.5 and +1.5 (Appendix 1), and accordingly, it was accepted that the data had a normal distribution (Tabachnick & Fidell, 2013). Margin of error was determined as .05 in the study. In variance analysis evaluations, homogeneity of the groups was determined by Levene's Test. Depending on the questions to be answered within the scope of the research, the differences between the groups were compared with two-way analysis of variance. As a result of the two-way analysis of variance, the differences between the means of the groups regarding the variables with significant F values were tested with the Scheffe Multiple Comparison Test.

In the study, effect size statistics were examined in order to determine the effect level of the independent variable on the dependent variable (Büyüköztürk, 2018). Multiple regression analysis was used in the study to examine whether psychological symptoms predict inferiority and superiority complexes. Prior to multiple regression analysis, presence of multicollinearity between the predictor variables was checked. Correlations between psychological symptoms were examined first. The highest correlation value (.77) was found between depression and interpersonal sensitivity. Çokluk et al. (2021) stated that there is a multicollinearity problem when the relationship between predictive variables is > .90. In this case, it can be stated that there is not a multicollinearity problem among the predictive variables of the research. In addition, Variance Inflation Factor (VIF) values were examined to determine that there was no multicollinearity problem, Tolerance Value (TV) was calculated for the independent variables, and Condition Index (CI) was examined. Çokluk et al. (2021) stated that when VIF ≥ 10, TV < .10 and CI > 30, multicollinearity problem should be considered. In this context, VIF, TV and CI values of the data were examined, and it was found that there was no multicollinearity problem. Therefore, multiple linear regression analysis was performed.

Results

In this part of the study, firstly, the results of inferiority and superiority complexes of the participants in terms of their demographic characteristics were presented. Next, the results regarding the predictive relationships between interpersonal sensitivity, depression, anxiety and anger/hostility, and inferiority and superiority complex were presented.

The mean inferiority complex scores of female participants who are the first, middle and last child of their family are higher than those of males. Similarly, the mean superiority complex score of female participants who are the first children of their families are also higher than the mean superiority complex score of male participants who are the first children of their families. On the other hand, it can be seen that mean superiority complex score of

men, who are the middle and last children of their families, is higher than that of females (Table 1).

Table 1

Descriptive statistics of inferiority and superiority complex scores of participants with different birth order in terms of gender

Birth order	Gender	Inferiority Complex			Superiority Complex		
		$\overline{X}$	SD	n	$\overline{X}$	SD	n
First	Female	24.76	7.40	68	26.01	5.39	68
	Male	22.84	9.39	64	25.95	6.16	64
	Total	23.83	8.45	132	25.98	5.76	132
Middle	Female	23.67	8.12	101	24.67	5.25	101
	Male	22.57	8.28	59	24.88	5.58	59
	Total	23.26	8.17	160	24.75	5.36	160
Last	Female	22.33	7.22	36	23.36	4.30	36
	Male	17.48	6.10	33	24.84	5.64	33
	Total	20.01	7.09	69	24.07	5.01	69
Total	Female	23.80	7.74	205	24.88	5.20	205
	Male	21.61	8.59	156	25.31	5.83	156
	Total	22.85	8.18	361	25.07	5.48	361

According to the results of the two-factor analysis of variance, the mean inferiority complex score of female participants was statistically significantly higher than that of male participants ($F = 8.35$; $p < .05$). In addition, according to the order of birth, it was found that there was a statistically significant difference between the mean inferiority complex scores of the participants ($F = 5.62$; $p < .05$). Comparison test results were examined to determine between which groups the difference was. According to the results, a significant difference was found between the mean inferiority

complex score of adults who were the last children of their families, and the mean scores of those who were the middle and first children. In terms of mean scores, it was found that inferiority complex mean score ($\overline{X}$ = 20.01) of the participants who were the last children of their families was lower than that of the participants who were middle children ($\overline{X}$ = 23.26) and those who were the first children ($\overline{X}$ = 23.83). Eta-square ($\eta 2$) coefficient calculated to determine the effect of birth order on inferiority complex of the participants is .03. This value indicates that the birth order variable has a "small" effect on inferiority complex. On the other hand, it was found that the interaction effect of birth order and gender variables on the inferiority complex scores of the participants was not significant (F = 1.31; p > .05). (Table 2).

Table 2 shows that there was no statistically significant difference between mean superiority complex scores of male and female participants (F = .77; p > .05). Also, Table 2 shows that there is a statistically significant difference between the mean scores of the superiority complex according to the birth order of the participants (F = 3.13; p < .05). Scheffe Multiple Comparison Test results were examined to determine between which groups the difference was. According to the results, a significant difference was found between the mean superiority complex scores of the adults who were the first children of their families and the mean scores of those who were the middle and last children. When the mean scores are examined, it can be seen that superiority complex mean scores of the participants who were the first child of the family were higher ($\overline{X}$ = 25.98) than those of the middle children ($\overline{X}$ = 24.75) and last children ($\overline{X}$ = 24.07). Eta-square ($\eta 2$) coefficient calculated to determine the effect of birth order on superiority complex of the participants is .02. This value indicates that the birth order variable has a "small" effect on superiority complex. In addition, it was found that the interaction effect of birth order and gender variables on the superiority complex scores of the participants was not significant (F = .48; p > .05).

Table 2

Descriptive statistics of inferiority and superiority complex scores of participants with different birth order in terms of gender

Complex	Source	Type III sum of squares	df	Mean squre	F	p	η²
Inferiority	Corrected model	1281.67	5	256.33	3.98	.00	.05
	Intercept	155032.41	1	155032.41	2411.81	.00	.87
	Birth order	723.32	2	361.66	5.62	.00	.03
	Gender	536.87	1	536.87	8.35	.00	.02
	Birth order*Gender	168.39	2	84.20	1.31	.27	.01
	Error	22819.54	355	64.28			
	Total	212640.00	361				
	Corrected total	24101.22	360				
Superiority	Corrected model	235.34	5	47.06	1.58	.16	.02
	Intercept	194510.93	1	194510.93	6529.81	.00	.94
	Birth order	186.76	2	93.38	3.13	.04	.02
	Gender	23.16	1	23.16	.77	.37	.00
	Birth order*Gender	28.60	2	14.30	.48	.62	.00
	Error	10574.78	355	29.78			
	Total	237737.00	361				
	Corrected total	10810.12	360				

According to the results of multiple linear regression analysis, anxiety, anger/hostility, depression, and interpersonal sensitivity together have a moderate and significant relationship with the inferiority complex scores of

adults (R = .662, R^2 = .438, p < .01). Together, these psychological symptoms explain approximately 44 % of the total variance in inferiority complex. According to the standardized regression coefficient (β), the relative order of significance of the predictor variables on inferiority complex is depression (β = .491), interpersonal sensitivity (β = .260), anxiety (β = -.073), and anger/hostility (β = .017).

The t-Test results regarding the significance of the regression coefficients showed that depression and interpersonal sensitivity variables were significant predictors of inferiority complex, while anxiety and anger/hostility variables are not significant predictors of inferiority complex. In addition, it was determined that psychological symptoms of anxiety, anger/hostility, depression, and interpersonal sensitivity are not significantly associated with adults' superiority complex scores (R = .108, R^2 = .012, p > .01). (Table 3).

Table 3

The results of multiple linear regression analysis

Variable	Complex	B	SE	β	t	p	Zero-order r	Partial r
(Constant)		11.748	.779		15.075	.000		
Anxiety Level		-.079	.074	-.073	-1.061	.289	.477	-.056
Anger/Hostility Level		.028	.092	.017	.310	.757	.403	.016
Depression Level	Inferiority	.387	.059	.491	6.534	.000	.637	.327
Interpersonal Sensitivity Level		.335	.076	.260	4.385	.000	.587	.226
(Constant)		24.415	.692		35.280	.000		
Anxiety Level		.029	.066	.040	.432	.666	.047	.023
Anger/Hostility Level		.079	.081	.072	.978	.329	.068	.052
Depression Level	Superiority	-.073	.053	-.138	-1.384	.167	.017	-.073
Interpersonal Sensitivity Level		.093	.068	.108	1.373	.171	.066	.073

For the inferiority complex: R = .662; R^2 = .438; $F_{(4, 356)}$ = 69.303; p = .000

For the superiority complex: R = .108; R^2 = .012; $F_{(4, 356)}$ = 1.042; p = .385

Discussion

The aim of this study was to examine the relationship of inferiority and superiority complex with various socio-demographic variables and psychological symptoms (anxiety, anger/hostility, depression, interpersonal sensitivity).

In the study, the main effect of gender was found to be significant, while the interaction effect of gender-birth order was not found to be significant. Accordingly, the inferiority complex level of women is higher than that of men. In the literature, it is seen that research on inferiority complex were mostly conducted in middle school and high school student population. In a study conducted with secondary school students, it was concluded that women's inferiority complex levels were higher than men, similar to the finding of the present study (Brier, 2018). On the other hand, there are also studies which concluded that inferiority complex levels of men are higher than women (Kalavani, 2017; Poorana-Nancy, & Dharma-Raja, 2018) or that the level of inferiority complex does not differ according to gender (Dhara & Barman, 2020; Kabir & Rashid, 2017; Kolisnyk et al., 2020). The inconsistency in research findings may be caused by various factors such as the difference in the measurement tools used, the age range of the participants and the limitations caused by the sampling method used in the research.

The result that women's inferiority complex levels are higher can be interpreted as different parental behaviors according to gender and cultural factors that pave the way for this. Sampaio & Vieira (2010) showed in their research that girls are exposed to more negative parenting behaviors than boys. It can be stated that there is a cultural basis in Turkey to confirm this finding. As a matter of fact, there are widely known proverbs in Turkey that compare the competencies of girls and boys, placing girls in a lower position in this comparison. Proverbs/idioms such as "Long haired, scatter brained", "Can five girls replace a boy? "Spare the rod and spoil the child" can be a reference source for adults in educating children. This may lead women to perceive themselves as inadequate compared to men and it can increase their inferiority complex levels. The result that the interaction effect of gender-birth order was not significant for inferiority complex brings to mind those other variables such as family dynamics, personal experiences, gender of the first/last born, age difference between siblings, etc. may be effective in explaining inferiority complex level.

In the research, it was concluded that the gender main effect of the superiority complex and the interaction effect of the gender-birth order is not significant. Studies on superiority complex in the literature are quite limited. In a study conducted with individuals aged 17-85 in Ukraine, it was reported that the level of superiority complex did not differ in terms of gender (Kolisnyk et al., 2020). The research finding can be explained by social values and expectations. It can be stated that the social acceptance of behaviors indicating superiority complex (Adler, 1956; Darmstadter, 1949) is low in Turkish society. In other words, in Turkish society, being respectful, tolerant, and humble is among the basic values that every individual should have, in contrast to the superior behaviors (Ministry of National Education [MoNE], 2011; Toprak et al., 2020). Therefore, the findings obtained in the research overlap with societal values and expectations in Turkey.

Another finding in the study is related to birth order. Accordingly, it was determined that the mean scores of inferiority complex of adults who were the last children were lower than the adults who were the first and middle children. This result is different from the expected result. One of the causes of inferiority complex is having been spoilt in childhood (Adler, 1932; Wright, 1925). Last children are children who are more spoilt by the mother than the other children (Adler, 1956) and who are always the youngest (Leman, 2009a). These factors may lead to the development of inferiority complex. However, factors such as the fact that last children have a lot of stimulation and a chance to compete (Adler, 1956); positive changes in the way parents take care of their children (Sampaio & Vieira, 2010), improved parenting skills of parents in time, the presence of siblings closer in age and competence instead of parents "who do everything well" and adults may be preventing the development of inferiority complex in last children.

Another finding in the study is that adults who are first children have a higher superiority complex level than adults who are middle and last children. According to the results of the research, first children are under stricter parental supervision (Kim & Wang, 2021; Ng et al., 2014), they are sixfold more likely to be punished by their parents for their failures in the

educational process compared to last children (Hotz & Pantano, 2015). First children are more disadvantaged in terms of maternal behavior compared to second children (Moore et al. 1997), and they are more likely to be physically abused by their fathers than middle and last children (Sampaio & Vieira, 2010). Additionally, the family environment of the first child is quite different from the environment in which other children are born. This is because the first children have only their parents as role models in the first years of their life, they are surrounded by many adults, and the first children try to "be capable like them" even though it is impossible (Leman, 2009a; 2009b). Therefore, all these factors can prepare a suitable basis for the first children to make negative evaluations of their competencies. In addition to these factors, with the birth of the sibling, first children gain older brother/sister status. It is understandable that first children have a high level of superiority complex compared to other children due to the admiration for the power of the lost throne (Adler, 1952), the effort to come to the fore (Adler, 1984) and the advantageous position brought by the new social role.

Another issue discussed in the study is the relationship between psychological symptoms and inferiority and superiority complex. Anxiety, anger/hostility, depression, and interpersonal sensitivity discussed in the study together explain approximately 44 % of the total variance in inferiority complex. This finding is consistent with previous research (Kabir & Rashid, 2017; Lee, 2008; Wang et al., 2012) and the Adlerian theory, which suggests that anxiety, anger, and depression may be indicators of the inferiority complex (Adler, 1932; 1956). Due to the nature of the inferiority complex, the individual who constantly reaches a negative conclusion about his or her competencies in comparison with others may experience various psychological symptoms, in other words, some psychological symptoms experienced by adults can be associated with inferiority complex.

Surprisingly, psychological symptoms are not a significant predictor of superiority complex. This finding is not consistent with Adlerian theory (Adler, 1932; 1945). Although superiority complex includes an approach that harms interpersonal relations (Adler, 1932), individuals with superiority

complex perceive themselves in a more advantageous position than others. In this case, the superiority perceived by the individual may gain a function that contributes to the well-being of the individual. In fact, it can be central to well-being (Headey & Wearing, 1988). Besides, superiority complex represents the next stage after the inferiority complex (Adler, 1945; 1956). Therefore, the developmental course of superiority complex is more complex than that of inferiority complex. Therefore, the obtained result may be related to the limited number of psychological symptoms in this study. There may be different psychological symptoms which are not examined within the scope of the research, but which may explain superiority complex. Another explanation in this regard may be related to the measurement tool used. In the study, the level of psychological symptoms was determined by using the SCL – 90 R. In this context, the findings obtained in the study should be evaluated by limiting to what the measurement tool measures. Future studies that will determine symptom levels with different scales may expand the findings on this subject and allow the findings to be examined comparatively.

Limitations and Recommendations

Results of the study should be evaluated by considering its limitations. Within the scope of the study, 361 adults were reached through convenient sampling method. The sample size is sufficient and acceptable; however, increasing the sample size and using probability sampling methods in future studies will further increase the generalizability of the results. Inferiority and superiority complex is related to individuals' childhood family environment (Adler, 1952). Child-rearing practices in Turkey may vary according to geographical regions (Ayçiçeği-Dinn & Sunar, 2017). Therefore, in future studies, ensuring the participation of individuals from different geographical regions in the study will enable interregional comparisons and also enable psychological counsellors and clinicians to conduct field studies on the subject. A limited number of psychological symptoms and socio-demographic variables were discussed within the scope of the study. Researchers can plan new studies that examine the relationship of inferiority and superiority

complex with different psychological symptoms and socio-demographic variables. This study is limited to adults aged 18 and over. Research on inferiority and superiority complex draws attention to adolescents (Kalavani, 2017; Poorana Nancy & Dharma-Raja, 2018). Therefore, examining inferiority and superiority complex in adolescents will make significant contributions to literature.

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Appendix A

Kurtosis and skewness values of the data

Scales	Kurtosis	Standard Error	Skewness	Standard Error
Inferiority Complex	.167	.256	.551	.128
Superiority Complex	.298	.256	.220	.128
Anxiety	.492	.256	.982	.128
Anger/Hostility	1.260	.256	1.364	.128
Depression	-.034	.256	.526	.128
Interpersonal Sensitivity	.044	.256	.448	.128

Research Article

The development and preliminary validation of the Serbian value lexicon – An archival approach to value measurement

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ABSTRACT

Values refer to stable beliefs and principles held by individuals, which guide their attitudes, behaviours, and judgments, and play a crucial role in shaping their identities and interactions with others. Studying values in social psychology is important as it provides insights into the motivational forces that drive individuals' behaviour and decision-making, shaping the dynamics of interpersonal relationships and societal interactions. The aim of this paper is to test the possibility of measuring basic values in the archive and text materials. Based on the Schwartz's theory of values and earlier work on the value lexicon in English, the Serbian lexicon of values was developed and preliminarily validated on a large-scale Internet-based survey. The lexical co-occurrence of words in the natural language use on the Internet was analysed in order to assess the convergent, discriminant and predictive validity of the lexicon. Lexical co-occurrence analysis showed that the words representing the same values co-occurred significantly more in comparison to the words denoting different values. The pattern of correlations between the values measured in the archive material on the Internet using the value lexicon showed high convergence with the pattern of correlations between the values assessed by the self-reported measures used in the European Social Survey in 2018. The relative prominence of the specific values on the official websites of the exemplar societal institutions

and organizations identified by the value lexicon was in line with the expectations and preliminarily confirmed the criterion validity of the lexicon of values. Possible applications of the lexicon of values, as well as some methodological issues pertaining to its future use, are discussed in the final part.

Key words: basic values, value lexicon, archival research, Internet-based research, Serbia

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Introduction

Values research is a critical area of study in social psychology that helps to understand the guiding principles and beliefs that shape individuals and societies. By examining the values that people hold, it is possible to gain insights into how these values influence behaviour, decision-making, attitudes, and social relationships (e.g., Roccas & Sagiv, 2017; Rokeach, 1973). This knowledge is particularly relevant in today's diverse and interconnected world, where cultural differences and clashes can lead to misunderstandings and conflicts. Moreover, values research can inform interventions and policies aimed at promoting social harmony, justice, and well-being by identifying and addressing the underlying values that drive behaviour (Crompton, 2010; Pavlović, 2021). Overall, values research plays a vital role in advancing our understanding of human behaviour and improving social outcomes.

Values are, in (social) psychology, typically studied via self-report measures and self-administered questionnaires that vary in the number of items, i.e., the measured values, stimulus types (e.g., words versus visual materials), response format (e.g., ranking versus rating) etc. (for an extensive overview see Roccas, Sagiv & Navon, 2017; Pavlović, 2021). But, simply put, all of these imply administering a questionnaire and relying on the self-report measures, which have some well-known weaknesses, such as social desirability, consistency, and memory biases (Araujo et al., 2017; Bardi et al., 2008; Podsakof et al., 2003; Roccas et al., 2017). Furthermore, impression management and self-deception, acquiescent responding, extreme responding, pattern and random responding etc. are well-known "troubles" of the self-report method in general (Paulhus & Vazire, 2007). Also, the need to develop the measures of individual values in the situations where reliance on questionnaires is "undesirable, impractical, or impossible" (Bardi et al., 2008, p. 483) is often emphasised. The measurement of individual values based on, broadly speaking, archive materials, primarily the text, user-generated or natural language use data, has been gaining much attention recently.

The natural language use approach in the study of values examines the individuals' language patterns, such as their words, expressions, and discourse, to gain insights into their personal values and belief systems. By analysing the linguistic cues and semantic structures employed by individuals, researchers can uncover the underlying value orientations and understand how they shape individuals' thoughts, attitudes, and behaviours (Pennebaker et al., 2003; Ponizovkiy et al., 2020). Similarly, by examining the linguistic cues and word choices employed by individuals, researchers can uncover meaningful associations between language use and personality dimensions (Pennebaker & Stone, 2003; Schwartz et al., 2013). Such procedures do not just overcome the self-report measures' weaknesses but offer a possibility to analyse values from inaccessible populations and in a great variety of time and places. Furthermore, values research simply cannot ignore the large amount of textual data produced and shared online in any moment (Ponizovkiy et al., 2020).

The basic assumptions of the natural language use approach are in line with the well-known psycho-lexical approach to the study of personality, which focuses on capturing the rich diversity of human personality traits by analysing and categorizing the natural language descriptors (Goldberg, 1981; Sausier & Goldberg, 1996). It seeks to identify and organize the fundamental dimensions of personality through the analysis of the words and language used to describe individuals' characteristics and behaviours. Although mostly used in personality psychology, it has already been successfully tested in the study of values as well (De Raad et al., 2016).

Relying on the Schwartz's theory of personal values (Schwartz, 1992; Schwartz et al., 2012) and earlier successful attempts at developing the lexicon of values (Bardi et al., 2008), this paper aims to develop the archival approach to the study of values and value lexicon in the Serbian language. We proceed as follows. We first shortly present the Schwartz's value theory and the archival approach to the study of values developed by Bardi et al. (2008). After that, we describe the current study and applied methodology in more detail. The obtained results are then shown and discussed. We conclude

with a number of possible implications and the future usage of the developed value lexicon in Serbian.

Schwartz's value theory and the archival approach to the study of values

The idea of measuring values in archive material is as old as the modern study of values and goes back to Rokeach's (1973) seminal study on the nature of human values. Arguing that the crucial difference between political ideologies lies in their focus on values of freedom and equality, Rokeach demonstrated this argument by content analysis of the documents written by the proponents of the, then, four main political ideologies: fascism, socialism, communism, and capitalism. Still, the main impetus for the archival study of values came from the attempts to apply the influential Schwartz's value theory to different types of textual data.

Schwartz's theory of values (Schwartz, 1992; Schwartz et al., 2012; Schwartz & Cieciuch, 2022) is a comprehensive framework for understanding and categorizing the values that individuals and societies prioritize. Values are defined as "trans-situational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity" (Schwartz, 1994, p. 21). The theory proposes that there are ten basic values that are universal across cultures and time periods, and that these values can be organized into a circular structure based on their motivational compatibility and opposition to each other. These ten values include (Schwartz, 1992): *Power* (control and influence over others), *Achievement* (personal success and accomplishment), *Hedonism* (pleasure and enjoyment), *Stimulation* (new experiences and excitement), *Self-direction* (independence and creativity), *Universalism* (social justice, equality, and tolerance), *Benevolence* (helping others and promoting their welfare), *Tradition* (preserving and respecting cultural and religious traditions), *Conformity* (obeying rules and fitting in with others), and *Security* (safety, stability, and order). This typology of values is based on the idea that values in the form of conscious goals represent three universal human existence requirements: 1) the necessity of satisfying biological needs,

2) the coordination of social interactions and 3) the survival and functioning of groups (Schwartz 1992; 1994; Schwartz et al., 2012; Schwartz & Cieciuch, 2022).

The circular structure of values indicates that some values are compatible and reinforce each other, while others are in opposition and can create tension (Schwartz 1992; Schwartz et al., 2012; Schwartz & Cieciuch, 2022). For example, universalism and benevolence values are compatible with each other, while power and benevolence values are in opposition. Schwartz has also identified several higher-order values that represent overarching goals, such as self-transcendence (combining universalism and benevolence values) and self-enhancement (combining power, achievement, and hedonism values) (Schwartz 1992; 1994; Schwartz et al., 2012; Schwartz & Cieciuch, 2022).

Schwartz's theory of values has been applied in various fields to understand the motivations and behaviours of individuals and groups. For example, it has been used to explain prosocial behaviour (Sanderson & McQuilkin, 2017), political activism (Veccione et al., 2015), and organizational behaviour (Arieli & Tenne-Gazit, 2017). The theory suggests that values are a key driver of human behaviour, and that understanding individual's values can provide insight into their decision-making processes and behaviour patterns.

Several self-report instruments for the measurement of Schwartz's basic values have been developed, most notably Schwartz's Value Survey (SVS, Schwartz, 1992), the 21-item Portrait Values Questionnaire (PVQ-21, Davidov et al., 2008) and the recently revised Portrait Values Questionnaire (PVQ-RR, Schwartz et al., 2012; Schwartz & Cieciuch, 2022). In recent years, the theory has been increasingly used in the 'questionnaire-free', theory-driven archive analyses. One of the earliest studies of this kind was conducted by Schwartz and Ros (1995), who contrasted the Western Europe and the United States cultural ideas, as expressed in the motto of the French Revolution and the American Declaration of Independence. Autonomy values were shown to be shared, but differences were visible in the importance given to Egalitarianism, Harmony, and Mastery values. Similarly, one study content-

analysed the values expressed in Czars' and Presidents' speeches in Finland from 1809 to 2000 (Portnam, 2014), using the qualitative coding manual created based on Schwartz's theory. In addition to the ten basic values, two value types, *Spirituality* and *Work-related* values, were identified.

Several studies used the Linguistic Inquiry and Word Count (LIWC, Pennebaker et al., 2007), the most commonly used language analysis tool for investigating the relation between word use and psychological variables, to analyse the user-generated content on social networking sites, such as Reddit (Chen et al., 2014), Facebook (Mukta et al., 2010) and Weibo (Sun et al., 2014) and to (successfully) predict the PVQ scores from users' status updates. For example, in the study by Chen et al. (2014), for each Reddit user, one LIWC measure for each LIWC category based on the user's posts/comments was calculated. The frequency of word use in one LIWC category was then correlated with the PVQ scores and it was shown that, for example, the higher importance of the Hedonism values was related to lower anxiety, fewer prepositions and words about the family, but more swear words. Mukta et al. (2010) used the PVQ scores of 397 Facebook users as a dependent variable, while the analytically determined best subset of the LIWC categories was used as an independent variable. For example, the family, affect, anxiety, feel, and such LIWC categories of words could have been used for computing the self-transcendence values from users' statuses. Fifteen different subsets of the LIWC features were then used to predict the PVQ scores in a series of regression models; between 13% and 21% of the variance in the PVQ measures could be explained by the LIWC categories.

Bardi et al. (2008) began with the idea that natural language use was a reliable and accurate indication of psychological constructs and created a lexicon of value terms to represent Schwartz's (1992) individual-level value theory. This value lexicon was subjected to convergent, discriminant, and predictive validity tests. They demonstrated the lexicon's convergent and discriminant validity by analysing its convergence with the structure of individual values evaluated by standard self-report techniques using an Internet-based methodology. Moreover, the predictive validity of the value

lexicon was evaluated by correlating the patterns of individual values as depicted in the American newspapers with the objective indicators of behaviours during the course of the 20th century. For example, more prominent Achievement values were positively correlated with the yearly number of patented inventions, Hedonism was correlated with alcohol consumption per capita and Stimulation with the number of the movies released. Similarly, higher voting participation was related to more prominent Self-direction and unwed births with the Conformity value (reversely scored) (Bardi et al., 2008).

Most recently, Ponizovskiy et al. (2020) conducted a similar analysis of a much wider scope on the corpus of the social media posts, essays, and works of literary fiction, containing 525,901,609 words authored by 182,197 individuals. They developed a Personal Values Dictionary (PVD), which comprises more than 1000 value-laden terms for detecting the references to the personal values in text, demonstrating its content, construct, and criterion validity.

All these studies have shown the general usefulness of the theory-driven approaches[1] to the study of values in archive materials and the applicability of Schwartz's theory. Still, all these were developed and tested in English and similar studies in other languages are absent.

The Current Study

This study aims at developing and validating the value lexicon in the Serbian language. Schwartz's value theory and different questionnaires in Serbian had already been validated, are available and were used in a number of research studies (e.g., Marušić-Jablanović, 2018; Radović, 2010; Radović et al., 2019; Pavlović, 2021; Pavlović & Stepanović Ilić, 2021; 2022; Lazić et al., 2021). There were also previous studies that analysed the conceptualization of

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[1] Another line of research, a data-driven or exploratory approach, similarly relies on the analysis of the user-generated and/or textual data, but with the main difference in the assumption that the content and dimensionality of specific values are to be empirically determined (see, e.g., Ponizovskiy et al., 2020).

values in the public discourse from the cognitive-linguistic perspective using newspaper materials (Vesić Pavlović, 2013). Still, the theory-driven archival approach based on Schwartz's theory, to the best of our knowledge, has never been used to study values in Serbian. Therefore, in the present study, the value lexicon representing ten personal values developed and validated by Bardi et al. (2008) served as a starting point; it was translated into Serbian, adapted, and then used in an Internet-based study.

The underlying assumption of this approach (in line with the psycho-lexical paradigm) is that natural language use provides a reliable and valid indicator of basic personality, cognitive, and social processes (Pennebaker & King, 1999; Pennebaker, Mehl, & Niederhoffer, 2003), and that, for any given construct, a lexicon of words that is indicative of the construct can be developed (Bardi et al., 2008). The degree to which words converge on the activation of the construct, their associative strength, can be measured by the relative co-occurrence of words (Bardi et al., 2008). Using Internet browsing for such a purpose is further justified by the studies that show the correlations between the number of Google hits and language norms regarding the word frequency estimates. For example, Blair et al. (2002), showed that Internet searches were a very useful instrument and an adequate indicator of the word frequency estimates. An archival approach which relies on this methodology thus seems reasonable and empirically supported by previous research, but solely in the English language. This study is hence an attempt to replicate and validate it in Serbian.

All said, the aims of this study are threefold: (1) to analyse the patterns of lexical co-occurrence of the words representing the same and different values, using the Internet as a source of archival data; (2) to compare the structure of the relationship between the values obtained in archive data and those from the self-report survey; and (3) to preliminarily test the criterion validity of the value lexicon, i.e. to demonstrate that it can identify the specific values in the type of text for which it can be reasonably expected to place special emphasis on them.

Method

The Development of the Value Lexicon

As stated, the development of the value lexicon started from the aforementioned study by Bardi et al. (2008). The list of words (30 of them in total) representing individual values, which was validated in that study, was first translated and back-translated by two independent researchers, following the same criteria used in the development of the English lexicon: each of the ten Schwartz's values was represented by three single words; the value labels itself (e.g., *sigurnost* [*security*]) was used as a word representing this value, when meaningful); only nouns were used; evidently polysemous words (having multiple meanings depending on the context) were avoided; in the situations where different alternative translations were possible, the words were chosen for the individual values that conveyed a certain meaning when they appeared together, although individually they may not inevitably indicate a specific value (Bardi et al., 2008).

The Refinement of the Value Lexicon

The translation process was monitored and evaluated by an independent researcher, an expert in value surveys. The lexicon words' translation was evaluated and compared to the existing translations of different versions of the questionnaires for measuring Schwartz's personal values that already exist in the Serbian language. The SVS questionnaire (Schwartz, 1992; Radović, 2010), PVQ-21 (Davidov et al., 2008; used in ESS round 9 in Serbia in 2018, see also: Pavlović & Stepanović Ilić, 2021; 2022), PVQ-RR (Schwartz et al., 2012; Radović et al., 2019) and Short Schwartz's Value Survey (SSVS) questionnaire, a short ten-item form (Lindeman & Verkasalo, 2005; unpublished data in Serbian), were used as guides during the final stage of the lexicon development. The main aim of refinement was to ensure that the translation of the lexicon of values was consistent with the terminology that appears in the existing translations. The list of words that were included

in the final form of the Serbian lexicon of values is shown in Table 1 (representing words in English are taken from Bardi et al., 2008, p. 486).

Table 1

Personal values and their representing words in the value lexicon

Value	Representing words in Serbian	Representing words in English
Power	*moć, snaga, kontrola*	*power, strength, control*
Achievement	*postignuće, ambicioznost, uspešnost*	*achievement, ambition, success*
Hedonism	*luksuz, zadovoljstvo, uživanje*	*luxury, pleasure, delight*
Stimulation	*uzbuđenje, raznovrsnost, stimulacija*	*excitement, novelty, thrill*
Self-direction	*nezavisnost, samostalnost, sloboda*	*independence, freedom, liberty*
Universalism	*jedinstvo, pravda, jednakost*	*unity, justice, equality*
Benevolence	*dobrota, velikodušnost, milost*	*kindness, charity, mercy*
Tradition	*tradicija, običaji, poštovanje*	*tradition, custom, respect*
Conformity	*uzdržanost, uvažavanje, brižnost*	*restraint, regard, consideration*
Security	*bezbednost, sigurnost, zaštita*	*security, safety, protection*

Data and measures

Joint probabilities. After the development of the final version of the Serbian value lexicon, the next steps in the procedure from the original study (Bardi et al., 2008) were replicated. They included a set of Google searches. The lexicon of values adequately represents Schwartz's 10 values if the words represent each of the values differently in terms of their relative frequency of co-occurrence in natural language used on the Internet. Put simply, if a certain set of words adequately represents a specific value, the co-occurrence of that particular set of words (e.g., *power* and *strength* as the indicators of the Power value) should be relatively more frequent than the co-occurrence of the words representing different values (e.g., *power* and *kindness*).

In order to obtain the data needed for the joint probabilities and co-occurrence calculations, Google searches of individual words from the lexicon were first performed, and then all the possible pairs of words from the lexicon were searched, resulting in a total of 465 Google searches (30 individual words and 435 of their possible pairs). All Google searches were limited to the websites in the Serbian language, Latin script and search terms in the nominative case[2]. Possible combinations of words from the value lexicon were searched following the rules of the so-called Boolean Google search terms (e.g., *moć* AND *snaga*). The searches were partially automated; the URLs for all 465 searches were first created and deployed in Google searches performed by R software (R Core Team, 2022), using the *RCurl* (Temple Lang, 2022a) and *XML* (Temple Lang, 2022b) packages. The main data returned referred to the number of Google search results (i.e., 'hits').

In line with the original procedure, lexical co-occurrence of the pairs of words for the same and different values was expressed in terms of their joint probabilities (JP), which were calculated by dividing the number of Google search hits for a pair of words (PH) and the average number of 'hits' for individual words (SH). For example, JP for *moć* and *snaga* was calculated as follows (hits expressed in 1,000s, see Appendix, Table 1 for the representative part of the row co-occurrence matrix):

$$JP_{moć*snaga} = (moć*snaga_{PH})/[(moć_{SH}+snaga_{SH})/2] = 5{,}770/[(5{,}210+8{,}780)/2] = 5{,}770/6{,}995 = 0.824$$

This resulted in 435 JP measures, one for each word-pair combination.

Convergent and discriminant validity. To test the convergent and discriminant validity of the value lexicon, Bardi et al. (2008) first studied the prevalence of words from the lexicon in the web/electronic newspapers in the USA archive in the period from 1900 to 2000. The relative number of

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[2] We will address the Serbian language peculiarities in more detail in the Discussion.

newspaper pages in which all three words for the individual value appeared (expressed as a ratio to the total number of pages) served as a measure of individual values. In this way, they obtained a yearly value score for each of the ten values during 101 years, which made it possible to calculate the intercorrelations between the values, and their convergence with the intercorrelations among the 10 values in participants' self-reports obtained in an independent survey.

Since a media/newspaper archive of a nearly similar volume in Serbian was not at our disposal (nor, to the best of our knowledge, exists), we once again relied on Google searches. We searched for the number of web pages containing all three words denoting each of the 10 values on a monthly basis, during the period from January 2012 to December 2022. This was done by limiting the web searches to specific time periods with the help of Google's advanced search option, i.e., the specification of a number of URLs used for Internet browsing[3]. More specifically, we determined the number of pages in the Serbian language on the Internet in which all three words representing, for example, Universalism (*jedinstvo* AND *pravda* AND *jednakost*) simultaneously appeared during the month of January 2012, and then during February 2012, and so on, for each month, ending with December 2022. The same procedure was repeated for each of the 10 values. This resulted in 132 monthly measures of the ten values, expressed as the number of the Google search hits in relative terms, i.e., the total number of hits for all three words (expressed in 1,000s) was divided by the number of hits for the word "*je*"[4]. These measures were then used to calculate the intercorrelations between values in the archive material.

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[3] All other technicalities related to the Google search are identical to those described earlier.

[4] The form of the auxiliary verb "biti" (to be) was arbitrarily chosen, with the reasonable assumption that it was highly unlikely that there existed a webpage in Serbian without this word. With this, we wanted to imitate the procedure that Bardi et al. (2008) had used, treating the number of newspaper pages containing the article "the" as a baseline.

As a self-report measure for calculating intercorrelations between the 10 values, the European Social Survey data (ESS), round 9, conducted in Serbia in 2018, were used (European Social Survey European Research Infrastructure, 2021). This study was conducted on the nationally representative sample of the Serbian citizens (N=2,043) and Schwartz's personal values were measured using the PVQ21. The measures of individual values are known to show rather lower internal reliability, since they are measured by a small number of items, selected to cover the different conceptual components of the value (e.g. Schwartz, 2003); our study showed that α for the ten values ranged from .44 (Conformity) to .78 (Hedonism). Multidimensional scaling (PROXSCAL) on 10 computed basic values (S-stress=.002; DAF=.99, Tucker's *phi* = .99) showed the satisfactory fit with the circular structure and ordering of values[5].

Two sets of 55 unique intercorrelations between the ten values were computed and then compared (as in the original procedure, the obtained correlation coefficients were Fisher Z-transformed before the analysis).

Predictive/criterion validity. To test the predictive validity of the value lexicon, Bardi et al. (2008) correlated the yearly measure of values, expressed in the American newspaper pages, with the yearly measures of different patterns of collective behaviour that could be treated as value-expressive behaviours. For example, the yearly alcohol consumption per capita was treated as an objective indicator of behaviour that expresses the value of Hedonism and was indeed correlated with the value of Hedonism measured in the newspapers. Due to a far narrower time frame observed in our study and the lack of relevant societal data that could be treated as value-expressive behaviour on a monthly basis (or significantly vary on a monthly basis at all), we deviated from the original procedure in this respect. We

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[5] The full analysis report is available at https://osf.io/nk8z7/?view_only= 3c2327fb3db54f1c9b51e984cfdd15cb.

applied a slightly different logic by assuming that the predictive validity of the value lexicon can be demonstrated in a sort of a test-standard scenario.

Certain institutions and organizations within the Serbian society can be perceived as bearers or promoters of specific values. For example, it can be reasonably expected that the Serbian Orthodox Church, in terms of ten values, should promote the value of Tradition and/or Benevolence more than, say, the value of Hedonism or Achievement. With this in mind, we selected four specific institutions and organizations as some sort of illustrative examples or showcases of the lexicon criterion validity. These were: *the Serbian Orthodox Church* (with the expectation that, as a protector of religious and cultural heritage, it should primarily exemplify Tradition), *the Serbian Army* (bearing in mind its main purpose of securing the national safety, it should promote Security), *the Civic Initiatives* (being one of the most important and visible NGOs and strongly voicing human rights and freedoms, it was assumed it should promote the value of Self-direction) and *the Serbian Association of Managers* (the organization aimed at promoting business, entrepreneurship and leadership, which should transpose to the promotion of Power and Achievement[6]). The criterion validity of the value lexicon would be demonstrated by higher prominence of those values that should be more propagated by these institutions, as compared to other values from the model.

In order to test our assumptions, we applied the similar methodology as earlier described. The official websites of the afore-mentioned institutions (www.spc.rs, www.vs.rs, www.gradjanske.org, www.sam.org.rs) were searched for the combinations of the value words indicators representing each of the ten values, using the previously described Boolean search terms and "in site:" specification. Bearing in mind a rather limited amount of 'content'

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[6] Bearing in mind the circular orderings of values in Schwartz's model, these expectations are only provisional since higher prominence of a certain value (e.g. Tradition) will probably be accompanied by relatively high prominence of adjacent values in the model (e.g. Benevolence or Conformity as adjacent to Tradition, or Power as adjacent to Achievement).

on these websites (as compared to site-unspecified searches), we introduced a slightly different procedure by searching for the co-occurrence of any of the value pairs for a specific value, and not all three words at the same time. For example, we searched for the number of 'hits' with *tradicija* AND *običaji*, then *tradicija* AND *poštovanje*, and, finally, *običaji* AND *poštovanje*; the number of search results was then averaged and divided by the number of 'hits' for the word "*je*", as a baseline. As such, each value was measured as an average proportion of the pages on a specific website that contained any word-pair combination serving as indicators of the specific values (for ease of inspection, we expressed it as a percentage of total pages).

All searches were carried out in the period January 25-27, 2023. The materials needed for the reproduction of the analysis reported here can be accessed at https://osf.io/nk8z7/?view_only=3c2327fb3db54f1c9b51e984cfd d15cb. The collected data were analysed by the IBM SPSS Statistics 21 software.

Results

Lexical Co-occurrence of Value Words in the Value Lexicon

For each of the ten values, Table 2 shows mean joint probabilities of the pairs of words representing the same value and mean joint probabilities of the pairs of words indicating different values (i.e., one word representing the target value and one word representing a different value). The mean joint probabilities for the co-occurrence of the terms indicating the same values should be greater than the mean joint probabilities for the pairings denoting different values, allowing the 10 values to be distinguished well by the value lexicon in the natural language use on the Internet. As expected, the mean joint probabilities for the co-occurrence of the pairs of words for the same value ($M = .36$) are significantly higher than the mean JP for the co-occurrence of the pairs of words for different values ($M = .16$), $F(1, 53) = 19.81$, $p < .001$, $\eta^2 = .27$, $d = .60$.

Table 2

Mean Joint Probabilities (JP) of Co-occurrence among the Words in the Value Lexicon

Value	Mean JP of the pairs of words representing the same value	Mean JP of the pairs of words representing different values
Power	.74	.24
Achievement	.40	.16
Hedonism	.21	.14
Stimulation	.13	.10
Self-direction	.42	.21
Universalism	.23	.15
Benevolence	.21	.12
Tradition	.44	.20
Conformity	.15	.12
Security	.66	.17

Convergent and Discriminant Validity of the Value Lexicon

Table 3 presents the intercorrelations between 10 personal values obtained in the archive data/natural language use on the Internet and in self-reported data, i.e., the ESS round 9 conducted back in 2018. Following the logic applied in the original study (Bardi et al., 2008), the Serbian value lexicon would serve as an indicator of individual-level values if the general patterns found in the 55 unique correlations acquired from the lexical co-occurrence of the 10 values in archive data displayed the same general patterns as 55 correlations gained from the general population of the Serbian citizens' self-reports of the 10 values. Similarly to the data reported in the original study (r = .93, p < .001), very high convergence between these two sets of correlations was registered, r = .94, p < .001[7].

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[7] As in the original paper (Bardi et al., 2008), this analysis is based on the Fisher Z-transformed correlation coefficients.

Yet, the pattern of correlations between the values in the archive material is far from perfect. There are some surprisingly negative correlations between adjacent values, such as, for example, Hedonism and Achievement, or positive correlations between the opposite values, like Achievement and Benevolence. These relationships probably stem from various possibilities of the concurrent use of different and opposing value terms online. Online debates that present the conflicting values or concurrent use of antonyms (Bardi et al., 2008), as well as the inability to consider the valence of value with an automated Internet search, are but some examples. Put differently, the words denoting opposing values could have co-occurred, resulting in a positive correlation, although the context of their use was in fact meaningful (for example, "*zaštita bezbednosti* ne sme voditi ugrožavanju *samostalnosti* i *slobode*", denoting concurrently opposing to the value of Security and supporting the value of Self-direction).

Table 3

Intercorrelations between 10 values in the archive data and self-report data

	1	2	3	4	5	6	7	8	9	10
1. Power	1	*.21* **	*.04*	*.02*	*.00*	*-.43* **	*-.36* **	*-.33* **	*-.11* **	*-.18* **
2. Achievement	.42 **	1	*.04*	*.11*	*.08*	*-.35* **	*-.23* **	*-.38* **	*-.30* **	*-.22* **
3. Hedonism	-.57 **	-.30 **	1	*.43* **	*.18* **	*-.43* **	*-.31* **	*-.43* **	*-.49* **	*-.34* **
4. Stimulation	.31 **	.32 **	-.24	1	*.22* **	*-.39* **	*-.30* **	*-.46* **	*-.48* **	*-.37* **
5. Self-direction	.81 **	.24	-.41 **	.16	1	*-.21* **	*-.18* **	*-.39* **	*-.37* **	*-.30* **
6. Universalism	.19	.12	-.14	.16	.14	1	*.32* **	*.26* **	*.19* **	*.23* **
7. Benevolence	.53 **	.45 **	-.38 **	.38 **	.31 **	.34 **	1	*.26* **	*.06*	*.18* **
8. Tradition	.90 **	.40 **	-.54 **	.31 **	.80 **	.18	.51 **	1	*.39* **	*.18* **
9. Conformity	.40 **	.32 **	-.25 **	.39 **	.30 **	.18	.37 **	.40 **	1	*.12* **
10. Security	.86 **	.30 **	-.42 **	.11	.88 **	.12	.37 **	.83 **	.31 **	1

Note. ** *p* <.001 (the Bonferroni correction). Correlations below the diagonal are from the archive data (*N* = 132); correlations above the diagonal (given in italics) are based on the self-reported ESS round 9 data (*N* = 594).

Predictive Validity of the Value Lexicon

The percentage of pages on the official websites of four institutions and organizations that contained any same value word-pair combination are shown in Figure 1. Mostly in line with our expectations, a higher relative occurrence of specific values on the institutional websites was registered. Out of ten basic values, Tradition showed the highest prominence on the website of the Serbian Orthodox Church. Power and Security were by far the most frequent values on the website of the Serbian Army, while Self-direction was the most prominent on the Civic Initiatives webpage. The Serbian Association of Managers webpage did show a relatively higher occurrence of the Power and Achievement values, in comparison to other values, although the most prominent value was in fact Security.

The percentage of pages mentioning the Security value was generally high on all websites, except the Serbian Orthodox Church. Apart from indicating a generally high significance of the Security value, this suggests possible differences in the meaning of this value in specific cases. One can advocate the *securing* and *protecting* of human rights and freedoms (Civic Initiatives), on the one hand, or stress the necessities to deal with the issue of economic *security* (Serbian Association of Managers), on the other, in which case the words denoting one and the same value, Security, are used in quite a different context.
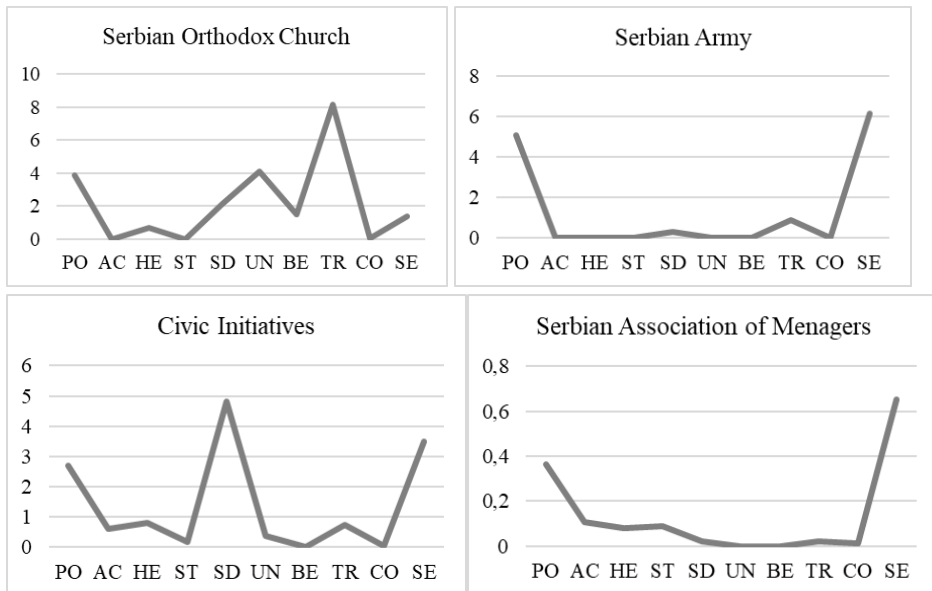
Figure 1. Relative occurrence of ten values on the official websites of four institutions expressed as a % of total pages.

Discussion and conclusion

The purpose of this research was to develop the value lexicon that would allow the measurement of value patterns without relying on self-report questionnaire responses, thereby facilitating the measurement of values over time and in real-world settings. The value lexicon was developed on the basis of Schwartz's (1992) value theory and recent advances in the study of associative meaning in natural language use and the existing value lexicon (Bardi et al., 2008). As such, the aims of this study were threefold. We, firstly, aimed to analyse the patterns of lexical co-occurrence of the words representing the same and different values, using the Internet as a source of archival data. The values were not assessed nor, as a matter of fact, expressed directly, but rather inferred from text, i.e., the co-occurrence of specific words in natural language use. It was shown that the lexical co-occurrence of the words representing the same values was higher than that of the words representing different values in natural language use on the Internet, i.e. the webpages in Serbian. Despite various external and uncontrolled influences

that could impact the way in which values are expressed in natural language, the significant increase in the co-occurrence of words related to the same values, as opposed to different values, across a vast amount of internet documents, highlights the value lexicon's ecological validity.

Furthermore, and related to our second aim, the pattern of correlations between the values measured on a monthly basis in the archive material on the Internet in the period from 2012 to 2022 showed a very high convergence with the self-report measure of values obtained in the ESS round 9, conducted on the nationally representative sample of the Serbian citizens. This demonstrated that the patterns of relationships between values expressed in natural language follow the theoretically described structure (Bardi et al., 2008; Schwartz, 1992). The expression of specific values in natural language seems to be guided by the very motivational dynamics described in the specific relationship of motivational (in)compatibility, which is in line with Schwartz's theory (Schwartz, 1992). Bearing in mind some deviations in the observed correlations between values, we must warn of certain inherent weaknesses of the co-occurrence measurement which does overcome typical weaknesses of the self-report measures but introduces some new ones as well. Yet, in the light of a large number of factors that could have influenced value expression in the language used on the Internet, which, importantly, could not have been controlled or even phantom, deviations are nothing but to be expected. Nevertheless, the significant convergence of the results from two distinctly different methodological approaches offers support for the validity of the value lexicon and for the indicators utilized to examine the possible relations between values and behaviours (Bardi et al., 2008).

Finally, the lexicon of values proved to be able to identify the differences in the prominence of different values on the official webpages of those institutions for which it can be reasonably expected to place special emphasis on the specific values from Schwartz's typology. Although only some kind of mimicking the values-behaviour analyses, if the website content can be viewed as a sort of collection of group behavioural traces, these data

indicate the existence of the meaningful values expression by the group or actual people in real time, despite it being affected by a number of external influences. Even more, it proved to be a useful venue for measuring the values of those 'agents' whose values are inaccessible to other types of value instruments, if any at all.

All said, the findings of this survey replicated the Bardi et al. (2008) findings in a different language and preliminarily validated the Serbian value lexicon and its utility for further use in the measurement of values at the time and in those places and contexts in which the use of a questionnaire is neither possible nor desirable. Available and relevant documents of individuals, groups, and organizations can be explored for the presence of values.

There are numerous potential applications of the lexicon of values. Studies in the Serbian language are far lagging behind both the theory- and/or data-driven archival approaches to the study of values. One reason for this is the lack of, in the broadest sense of this term, text corpora in Serbian that could be used for the present purposes. The other and probably more important reason for this is the lack of research that would offer a valid 'tool' for the measurement of values in this way or, at least, credible evidence that such a measurement in Serbian is possible at all. This study thus presents a small-scale attempt to preliminarily establish evidence of a kind that would, hopefully, motivate further and more thorough research. The developed Serbian value lexicon can be used for the purposes of analysing individual differences in values in user-generated content such as posts on social networking sites; further, organizational and group values can be measured by analysing their official documents, such as the content of the official webpages utilized here, or other relevant text materials, for example, party manifestos when addressing the issue of parties' value promotion (e.g. whether the leftist parties "speak", as expected, more in terms of Benevolence, and the rightist more in terms of Tradition) or school textbooks (e.g. whether civic education materials stress the Self-direction values) when one is interested in the question of values embedded in the educational system. If or when a credible source of sufficient breadth and scope is

identified (e.g., a newspaper archive), the societal or population level values can be assessed as well, just in line with the Bardi et al. (2008) approach, only slightly covered in the present study.

Depending on the particular micro-/mezzo-/macro-focus, further possibilities for addressing the issues of the relationship between value preference and other relevant psychological phenomena (e.g. between values and behaviour, by measuring the presence of Benevolence and Universalism values in the essays describing reasons for prosocial behaviour, or Hedonism values in the description of leisure time activities practiced), group differences in values (e.g. promotion of values in different parties' manifestos, differences in the values embedded in different type of educational institutions – say, business versus medicine schools or faculties) or changes in societal values over time (e.g. differences in the prominence of Self-direction values before and after the so-called democratic changes in Serbia in 2000, or differences in the Tradition values promotion in history schoolbooks from the Socialist as compared to the pluralist period) become research questions that can be empirically addressed. Such a study would have some very important advantages over typical value research based on the self-report measures. Assessing values in archive and secondary materials – the products of social interaction made for some other, non-research "purposes" – implies studying real life phenomena right there where they happen, granting high ecological validity. Furthermore, there are additional possibilities of integrating the present lexicon of values into some other well-known text analysis procedures and software, such as the LIWC (Pennebaker et al., 2007), thus opening up new research opportunities (e.g., analysing whether the values measured in the text are related to the differences in frequency of other LIWC categories).

Limitations and recommendations for future research

There are several important limitations of the presented analyses which should be addressed in future research. Some of these stem from the informed and weighted, but, nevertheless, arbitrary decisions made during

the research process. The lexicon used in this study is but one of the many possible and, probably, equally valid sets of words in Serbian representing basic values. Hence, for example, whether to use the word '*uspeh*' or the word '*uspešnost*' – both equally good and acceptable translations of the English word '*success*' – was, in essence, an arbitrary decision. Bearing in mind that the lexicon of values used in this research is relatively short, it may not cover the full content of the basic values (see also Ponizovskiy et al., 2020), especially the refined theory of values proposed by Schwartz et al. (2012). Further research could benefit from using a larger set of words and lexicon refinements which would be more in line with the refined theory of values or include the main synonyms or words very similar to those that ended up in the final version of the value lexicon developed in this survey.

Additionally, Google searches, as well as the automated text analysis of this kind, remain 'blind' for all the language peculiarities which we had already mentioned earlier, such as the words' connotation, use of antonyms, differences in meanings across different contexts of language use etc. Language-related issues that are specific to Serbian warn further caution. The Serbian language has seven noun cases and two legitimately used scripts (Latin and Cyrillic). Although Google searches with, say, the noun[8] in the nominative case and the Latin script (as used in this study) report the number of hits that include both the Latin and Cyrillic and all the noun cases, possible differences in search results depending on the noun case and the used script deserve more attention in future studies[9]. Furthermore, Internet archives in

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[8] Using nouns as value terms has additional theoretical significance because it serves to mainly capture the terminal values only, escaping all of the peculiarities with the differentiation between the terminal and instrumental values (Rokeach, 1973), which the most recent Schwartz's value model abandoned. Some of the mentioned value questionnaires used a small number of items to measure personal values and used nouns exclusively (e.g. SSVS, Lindeman & Verkasalo, 2005).

[9] During the study preparation and before conducting the Google searches reported here, we piloted different search scenarios, using, for example, the Cyrillic script or averaging the number of search results for the same noun in different cases. Although there were some differences in search results between these solutions and

Serbian (e.g. those of the leading media) cover a relatively short time span, and greatly vary in the amount of content and web infrastructure. Therefore, instead of solely relying on Google searches, future research would benefit from supplementing it with textual material and reliable corpora of different sources (such as the newspaper archive used in the original study or available language corpora in Serbian, e.g., srWAC and similar).

Similarly, further refinement and testing of different procedures and solutions for the estimations of value prominence should be probed in future research. For the present purposes, the performed analyses are sufficient to answer the research aims. But that would, in fact, be necessary if the value lexicon were to be used in the text materials that are organized by some other principle. For example, it could be adapted to some well-known concordance measures used in linguistic research which take into account the number of words in some limited text unit (e.g. normalized frequencies per thousand words or per million words). Some other networking and mapping technique could also be probed when analysing the patterns of co-occurrence in future research or for some other purposes.

Finally, while the lexicon development and lexical co-occurrence analysis followed the original procedure in full, and the analysis of its convergence with the self-report measure for the most part, the main limitation of the present study is related to the analysis of the lexicon's criterion validity. The analysis of the criterion validity of the value lexicon was only exploratory here and necessitates further studies, for which the present research, hopefully, offers a starting point and useful input. Along with the measures of values assessed by the value lexicon, using objective, and, preferably, behavioural measures obtained from independent sources when estimating criterion validity would be most welcome.

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those that were finally implemented, these were almost negligent and suggested that there were no reasons not to adopt a more parsimonious solution. This is why, for example, we did not use a lemmatization strategy.

Conflict of interest

We have no conflicts of interest to disclose.

Data availability statement

Data and materials needed for the reproduction of the results reported in the paper are available at: https://osf.io/nk8z7/?view_only=3c2327fb3db54f1c9b51e984cfdd15cb.

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Appendix A

A representative part of the raw co-occurrence matrix for the value words (the number of Google hits in 1,000)

	moć	snaga	kontrola	postignuće	ambicioznost	uspešnost	luksuz	zadovoljstvo	uživanje	uzbuđenje	raznovrsnost	stimulacija	nezavisnost
moć	0	5770	3100	331	315	1110	416	2050	1910	629	239	194	858
snaga	5770	0	5900	337	405	1540	763	2790	1790	748	297	384	2030
kontrola	3100	5900	0	197	240	678	382	1460	1110	338	196	249	753
postignuće	331	337	197	0	36.6	53.7	37.1	189	111	72.4	51.4	41.1	108
ambicioznost	315	405	240	36.6	0	146	58.5	232	130	68	81.9	52	153
uspešnost	1110	1540	678	53.7	146	0	130	481	341	121	50.1	77.5	257
luksuz	416	763	382	37.1	58.5	130	0	510	397	101	136	39.1	181
zadovoljstvo	2050	2790	1460	189	232	481	510	0	1560	523	395	300	516
uživanje	1910	1790	1110	111	130	341	397	1560	0	357	114	131	327
uzbuđenje	629	748	338	72.4	68	121	101	523	357	0	91.3	117	190
raznovrsnost	239	297	196	51.4	81.9	50.1	136	395	114	91.3	0	40.5	178
stimulacija	194	384	249	41.1	52	77.5	39.1	300	131	117	40.5	0	93.1
nezavisnost	858	2030	753	108	153	257	181	516	327	190	178	93.1	0
samostalnost	866	1520	832	89	127	237	128	459	371	111	83.8	103	585
sloboda	2180	2860	1670	211	285	413	441	1550	1170	386	337	185	2030
jedinstvo	965	1530	677	100	108	329	138	616	313	151	107	73.2	480
pravda	889	1820	679	73.7	114	180	142	512	320	117	118	74	667
jednakost	430	390	355	57.3	72.3	101	44.1	237	160	65.5	129	81.6	341
dobrota	526	695	325	53.8	72.5	88.4	59.1	395	224	112	99.9	56.7	352
velikodušnost	281	334	129	47.6	49.9	37.9	59.9	203	137	82.5	38.3	19.9	87.5
milost	752	947	395	53.4	106	131	102	502	237	146	109	66.9	440
tradicija	2110	2750	1320	145	233	456	310	1240	1440	302	449	165	763
običaji	1580	1930	787	64.6	102	391	250	654	666	166	205	92.6	571

poštovanje	2640	4200	2230	197	211	606	359	1930	1070	346	337	233	976
uzdržanost	403	591	358	46.7	33.9	91.8	58	238	169	39.7	81.5	44.7	292
uvažavanje	199	201	118	29.3	35.5	59.7	41.8	125	117	56.7	37.1	20.9	73.5
brižnost	132	194	130	9.44	44.6	51.7	28.4	107	51.4	30.3	41	44.8	115
bezbednost	1360	2740	1930	93.6	126	797	230	707	874	178	308	210	925
sigurnost	2310	6650	3260	209	240	339	310	1800	1580	406	236	222	914
zaštita	4960	11700	6310	263	271	1350	640	3010	2270	507	302	336	1310