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- CAREER READINESS IN DEAF AND HARD-OF-HEARING STUDENTS
- FAMILIES AND SELECTIVE MUTISM IN CHILDREN
- CHALLENGES IN INCLUSIVE TEACHING
- COMPARING HOME AND CENTER EI SERVICES
- VERBAL FLUENCY ACROSS DIFFERENT NEUROLOGICAL DISORDERS

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Career readiness in deaf and hard-of-hearing high school students in special education

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Introduction. A successful career is one of the key factors that ensure meaningful social integration for people with disabilities. Considering that career choices are made by adolescents immediately after graduation from high school, it is vital that special schools' career guidance programs effectively address typical challenges for each type of disability. *Objectives*. The aim of this study was to examine career readiness in deaf and hard-of-hearing (DHH) high school students educated in special schools in Russia and reveal gaps and specific challenges that could be addressed through tailored guidance programs. *Methods*. Two studies on career readiness were conducted, involving a total of 410 participants, including DHH high school students (N = 205) and high school students without hearing impairment (N = 205). *Results*. Findings indicated statistically reliable differences in career readiness, intensity of career preferences, and range of professional domains of interest between DHH students and their hearing peers. Qualitative results supported earlier observations about the vulnerable position of young DHH people in making career choices. *Conclusion*. The identified challenges in career readiness among DHH high school students allowed us to justify urgent directions for their career guidance, including self-awareness, awareness of professional domain and labor market, and the ability to align individual health issues with occupational demands.

Keywords: career guidance, career readiness, high school students, hearing impairment

Introduction

The following rights of people with disabilities are ensured and protected by major initiatives of UN specialized agencies: the right to accessible quality education (UNESCO Convention against Discrimination in Education, 1960;

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UNESCO Inclusion and education: all means all, 2020); the right to full access to education, training, culture and information (UNESCO Sunberg Declaration, 1981), the right to career guidance, vocational training, and employment (ILO Convention on Vocational Rehabilitation and Employment of Persons with Disabilities, 1983), the right to social assistance and support (UNICEF Social Inclusion people with disabilities, 2024). To implement these rights, the participating countries create conditions for accessible vocational education and the labor market, and develop special career guidance programs for persons with disabilities (Mirzabalaeva & Pashkova, 2024). Career guidance interventions encourage a person's career choices by fostering career readiness (Zeer et al., 2005) – understood here as a system of motivational, cognitive, operational, and reflective components (Zenina, 2012).

The importance of career guidance research is proven by numerous studies in this field. A systematic review by Soares et al. (2022) analyzed scientific papers on career guidance research published between 2000 and 2021; the geographical scope of the review included 11 countries. The authors focused on preferred career guidance modalities, domains, and the effect of interventions. According to the review, in the international career guidance practice, the most common learning outcomes are decision-making skills in career choices, career planning competence, and a positive attitude towards the chosen field. It is reported that the effect of career guidance interventions is not associated with time or session numbers. At the same time, the variety of domains is an important factor to consider. The authors point out that most of the published studies overlook vulnerable groups of students, including students with disabilities, and emphasize the need for focused research in this area (Soares et al., 2022).

Several authors have proposed conceptual approaches for school-based career guidance. Altukhov et al. (2007) describe informational, diagnostic, counselling, developmental, and activating approaches, whereas Pryazhnikov (2005) suggests the construction of a "personal professional perspective". Kondratyuk et al. (2023) explore the methodology of developing career plans with high school students, emphasizing the influence of conscious self-regulation and career adaptability on the determination and stability concerning their professional and academic plans.

A number of studies discuss the challenges faced by adolescents when transitioning from school to higher education. Hoff et al. (2022) point to aligning personal aspirations with labor-market realities. Chen et al. (2022) mention limited knowledge of career-planning processes in Chinese college students. As Croatian high school students associate a lack of career readiness with insufficient or inconsistent information, Sverko et al. (2016) advocate introducing career guidance programs for high school students. Maggio et al. (2020) highlight the role of state personal and social hope in career construction

and suggest that career interventions for adolescents should be based on the life design approach. When exploring gender differences in Swedish adolescents' career choices, Tellhed et al. (2018) reveal strong gender differences in ability beliefs and explain the appeal of gender-balanced programs.

The need to develop specialized career guidance programs for students with disabilities is emphasized in several studies (Bukina et al., 2022; Soares et al., 2022). Researchers emphasize the importance of forward-looking initiatives (Alekhina, 2016) and providing sufficient information (Volkova et al., 2019). However, few studies focus on developing career competence in deaf and hard-of-hearing (DHH) high school students, although there is evidence that, compared to their hearing peers, DHH individuals tend to be less educated and face higher unemployment and underemployment rates (Punch et al., 2004). Furthermore, a recent study in 408 emerging adults from two Chinese higher institutions revealed that DHH individuals frequently encounter challenges in career decision-making, with professional uncertainty being inversely associated with high self-esteem and overall life satisfaction (Yuan et al., 2022). When analyzing this problem, the authors identify knowledge and skills gaps that may hinder successful career development. Furlonger (1998) underlines gaps in communication skills that are important for employment in the social and entrepreneurial spheres. Nagle et al. (2016) conclude that DHH high school students prefer subjects and assignments that contribute to practical skills rather than theoretical and academic knowledge, which further prevents them from pursuing advanced studies. Many researchers also highlight a lack of reading comprehension (Kuntze et al., 2023) and writing skills (Krasavina et al., 2025).

Punch et al. (2006) revealed career barriers perceived by DHH adolescents. In addition to issues related to difficult professional duties, DHH high school students have concerns about the workplace attitudes, possible misunderstandings, group communication (communication with several interlocutors), and occupational inaccessibility. When analyzing the factors influencing the career decisions of DHH high school graduates, Danermark et al. (2001) conclude that competent career guidance is of greater importance for university enrolment than social factors or factors related to the degree of hearing loss (given normal intellectual capacity). These results are consistent with the results of further studies (Punch et al., 2005), where authors identify vital areas of career guidance for DHH students including detailed information about particular occupations, medical contraindications and possible solutions for difficulties associated with hearing impairment; opportunities for further education and career development; assertiveness trainings; raising awareness in parents, teachers and high school DHH students to increase career expectations. To conclude this section, the literature review confirms career guidance to be a topic of interest for international research, with a considerable number of authors agreeing on the need for focused research on vulnerable groups. However, there

is a lack of recent empirical studies on designing career guidance programs for DHH students that are compliant with their special needs and current challenges.

Objective

The aim of this study was to examine career readiness in DHH high school students educated in special schools in Russia and reveal gaps and specific challenges that could be addressed through tailored career guidance programs. The first part of the study focused on general career readiness. The second part included an assessment of the intensity of career preferences and the number of professional interest domains.

Methods

Research design

The research implied two studies on different aspects of career readiness involving DHH high school students and their hearing peers. Data were collected through surveys and then analyzed and compared using an independent-samples t-test. Both surveys were linguistically adapted to improve comprehension among DHH high school students. Written consent to participate in the research was obtained from all participants; for minors, the consent was signed by their legal representatives.

Study 1

Career readiness is considered to be a complex concept involving a person's knowledge, skills, strategies, and behaviors related to career choices (Dodd et al., 2022). Therefore, our choice of career readiness measure was justified by a holistic approach, where career readiness was analyzed in several aspects: motivation, career awareness, barrier awareness, and behavior (Pryazhnikov, 2005), as shown in Table 1. The questionnaire included 10 open-ended questions addressing these aspects. The design of the questionnaire allowed us to collect both qualitative and quantitative data. Comments were analyzed with grounded theory (Strauss & Corbin, 1990), implying open coding to reveal parameters and scales related to categories, which were identified deductively. This process involved two coders: a career guidance counselor and a career psychologist; discrepancies in coding were resolved through discussion. Each answer was also evaluated with a 5-point scale, assessing the answer integrity. Sum scores classified participants into low, medium, or high career readiness levels.

Study 2

To examine career preferences, we used a quantitative survey (Shmelev, 2020). The methodology included assessing participants' preferences in the following areas: engineering, artistic creativity, communication and interaction, service and assistance, management, information, and nature. The participants had to assess their interests in these spheres on a 10-point scale. The survey scales allowed us to assess the intensity of career preferences and the number of professional interest domains, and assess career preferences as: low (interested in 4-5 professional spheres), medium (interested in 2-3 professional spheres), or high (1 predominant professional sphere).

Table 1

Career readiness questionnaire: aspects

Aspects	Categories	
Motivation	1.	Recognizing the significance of career readiness
	2.	Prevalent motives for career choices
	3.	Career preferences
Career awareness	4.	Self-awareness
	5.	Labor market awareness
	6.	Professional domain awareness
	7.	Independent information search skills
Barrier awareness	8.	Assessment of internal and external challenges
Behavior	9.	Establishing short-term career goals
	10.	Planning actions to overcome difficulties

Data collection

The study involved 410 high school students (205 DHH high school students with medically confirmed hearing impairment, and 205 high school hearing students matched for age, grade, and region). Data was collected during career guidance group meetings organized in special schools and universities in 5 regions of the Russian Federation: the Republic of Bashkortostan, the Republic of Mari El, the Udmurt Republic, the Kirov and Orenburg regions. All DHH participants attended special schools, suffered from moderate to profound hearing loss, and were bilingual, with predominant communication in sign language.

Results

Study 1

Quantitative Results

Descriptive statistics related to career readiness in DHH high school students (group 1) and high school students with no hearing impairment (group 2) are presented in Table 2. The t-test showed a statistically reliable difference between the scores of students with and without hearing impairment ($t(408) = 11.55$, $p < .001$, $d = 1.14$). Table 3 presents summary data on career readiness levels in DHH students (Group 1) and students with no hearing impairment (Group 2).

Table 2

Descriptive statistics for the career readiness survey

Group	N, students	M ±SED	Median	Variance
Group 1 (DHH students)	205	2.80±1.17	3	1.367
Group 2	205	3.95±0.97	4	0.952

Table 3

Summary data for career readiness levels

Criteria	Level of career readiness					
	High		Average		Low	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
Students, %	24.9	65.9	35.1	22.0	40.0	12.1

Qualitative Results

When analyzing qualitative survey data, the comments were divided into categories, and then parameters and scales were derived to describe the related trends. The categories were defined by the design of the career readiness questionnaire. The coders identified different trends among DHH participants and their hearing peers.

Motivation

The analysis revealed that DHH participants lacked a clear understanding of the need to make career choices, and expressed uncertainty about their professional future as they described it in general terms, showed doubts about

career choices, or had not decided on a career field yet. The prevailing motives for career choices in DHH students were the avoidance of failure (preference for jobs perceived as "simple and easy to learn"), financial status, and prestige. Commonly selected careers included those of an engineer, programmer, teacher, psychologist, pharmacist, coach, and a designer, which rather confirms some stereotypical professional choices. At the same time, the vast majority of DHH participants had not decided on a higher or further education institution, which hindered career planning.

In contrast, participants without hearing impairment displayed significantly different patterns. The majority of hearing students have decided on a career field, noting that their career choices are based on their hobbies and interests, and involve opportunities for promotion and financial well-being. Commonly selected jobs included: programmer, advertising specialist, engineer, doctor - careers typically perceived as prestigious. Hearing students specified which universities they would apply to for admission, and had several alternative options.

Career awareness

Findings revealed low career awareness in both DHH and hearing participants, with one exception: students without hearing impairments exhibited a higher level of professional domain awareness. They provided a detailed description of the roles and responsibilities associated with their future career choices and could articulate the rationale behind their choices. Hearing students indicated that they were aware of their own traits and abilities, referring to the results of professional and personal assessments. Their evaluation of a career's relevance was based on publicly available data and university admission trends. Hearing students justified the need to analyze the national labor market and expressed willingness to relocate for study or work, demonstrating a broader, more flexible career outlook.

In contrast, when writing about a professional domain, DHH high school students tended to rely on their limited experience, such as school-based career tests. When analyzing personal traits and abilities, DHH students often identified only health issues, but struggled to relate them to professional demand, for example, choosing jobs that require excellent speaking skills (e.g., teaching, psychology). Common answers indicated difficulties in labor market assessment, and DHH students' unawareness of career relevance. When searching for information, they relied on social surroundings (parental and peers' opinions), and expected teachers to provide all the information about further education.

Barrier awareness

Most participants across both groups demonstrated the ability to anticipate potential challenges, commonly referring to external obstacles. Both DHH and hearing participants noted high competition for admission, and indicated limited financial resources when considering fee-based education. Reported internal difficulties included test anxiety related to taking graduation/ entrance exams.

Additionally, barriers mentioned by DHH students included a lack of accessible information regarding appropriate career paths, academic programs, and admission requirements for students with disabilities. Notably, about one-third of DHH participants refused to answer or admitted that they had not considered potential obstacles at all.

Behavior

DHH students are aware of ways to overcome obstacles, noting that they need support in preparing for entrance exams and navigating the application process. At the same time, they admitted having difficulties in planning real actions to overcome obstacles and expressed uncertainty about how to begin taking steps toward their goals.

High school students without hearing impairment not only recognized additional exam preparation (e.g., tutoring) but also demonstrated readiness for independent information gathering and self-directed learning. Most hearing students have already decided on a plan that includes attending university events (such as University Open Days, Olympiads, and career workshops) and have already made choices about exam preparation (e.g., tutoring or self-study).

Study 2

Descriptive statistics related to career preferences in DHH high school students (group 1) and high school students with no hearing impairment (group 2) are presented in Tables 4 and 5. Table 4 presents data on the intensity of career preferences, and Table 5 presents data on the range of professional domains of interest.

Table 4

Descriptive statistics for career preferences intensity (interest across domains)

Group	N, students	M ±SED	Median	Variance
Group 1 (DHH students)	205	5.36±1.44	5.4	2.088
Group 2	205	6.41±1.91	7.0	3.640

Table 5

Descriptive statistics for the range of professional domains of interest (number of domains)

Group	N, students	M ±SED	Median	Variance
Group 1 (DHH students)	205	2.95±1.43	3.0	2.060
Group 2	205	2.0±1.23	1.5	1.507

The t-test for career preferences intensity (interest across domains) showed a statistically reliable difference between the scores of students with and without hearing impairment (t (408) = 6.69, $p < .001$, $d = 0.66$). The t-test for the range of professional domains of interest (number of domains) also showed a statistically reliable difference between the scores of students with and without hearing impairment (t (408) = 6.97, $p < .001$, $d = 0.69$). Table 6 reports summary data for levels of career preferences assessment in DHH students (Group 1) and students with no hearing impairment (Group 2).

Table 6

Career preferences assessment in DHH and hearing high school students

Criteria	Career preferences level					
	High		Medium		Low	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
Students, %	20.9	62.0	63.9	24.9	15.2	13.1

Findings revealed that only 21% of DHH participants and 62% of hearing participants demonstrated a high interest in a single field. Interests of DHH students clustered around domains of information (preference for working with documents, texts, data, and numbers) and engineering (preference for working with technical devices, driving vehicles, manufacturing, and construction). Career preferences of hearing students were more diverse. Along with a high interest in information and engineering, students showed interest in scientific research and analytical work, working with people, and management. 64% of DHH students and 25% of hearing students showed medium interest spread across two to three fields, which is an age-typical but non-decisive pattern. Low interest across all fields was recorded in 15% (Group 1) and 13% (Group 2) of students.

Discussion

Statistically reliable differences in career readiness, intensity of career preferences and a range of professional interest domains, as well as qualitative results, support earlier observations about vulnerable position of young DHH people in making career choices (Punch et al., 2004) and vocational identity

(Yuan et al., 2022), especially those who study in special schools and lack massive communication with hearing peers. The findings about DHH high school students in Russia revealed that although many of them express an interest in pursuing higher education, the majority experience significant difficulties in making their first career choices, including choosing an educational institution. DHH high school pupils educated in special schools in Russia lack the ability to connect specific careers with educational programs or to develop a clear strategy for obtaining professional qualifications. They often face uncertainty and struggle to formulate coherent professional plans. Their understanding of the labor market relevance of chosen careers is limited. These students tend to rely on their immediate social circle for support and guidance, often not recognizing the potential benefits of professional career counseling. These findings suggest that career guidance programs for DHH high schoolers in Russia should focus both on raising career awareness and motivational support. This includes guidance in structured career planning, raising awareness about accessible education, the active involvement of parents and teachers, and engagement through interactive activities such as professional trials, mentorship sessions with graduates with disabilities, and hands-on workshops.

Another difficulty revealed in this study is a problem of DHH participants' personal self-awareness, including a lack of insight into personal strengths, aspirations, and confidence. These conclusions are supported by previous research, including studies of Punch et al. (2006), Simonova et al. (2021), and others. This study also revealed that the professional interests of DHH high school pupils are scattered across multiple fields. While a broad range of interests may offer flexibility, it also hinders the identification of a focused career and prevents setting short and long-term career goals.

Our findings reinforce the importance of tailoring career guidance for DHH students considering their health conditions, informational gaps, specific needs, and the realities of the regional labor market (Volkova et al., 2019). The identified challenges in career readiness among DHH high school students in Russia allowed us to justify key directions for their career guidance: raising awareness of personal traits and career requirements; providing detailed information about the relevance and scope of professions; providing detailed information about accessible educational programs; teaching how to align individual health issues with occupational demands; teaching how to match careers with suitable educational programs and one's own educational background. Thus, the study provides empirical support for previous conclusions on the scope of career guidance programs intended for DHH high school students (Punch et al., 2004) and on the need for collaboration among school and university career counseling specialists, social institutions, employment services, and the students' families (Bonkalo et al., 2015). Comprehensive professional diagnostics of career readiness should be followed by the development of tailored career guidance

programs that would help DHH individuals develop their career awareness and make career choices based on personal goals, self-awareness, labor market, professional domain awareness, and career planning skills.

Conclusions

The problem of developing comprehensive and effective career guidance programs for DHH high school students is a pressing issue that lacks recent empirical research. Our study allowed us to highlight the main gaps in career readiness and thus identify career guidance domains that should be prioritized. DHH students must receive proper career guidance, including motivational support, raising self-awareness, career awareness, barrier awareness, and developing practical skills in career planning. Identifying prior challenges should be included as the first step in career guidance programs, followed by introducing tailored interventions to address the problems. Individual counseling focusing on a specific career field would provide a deeper understanding and confidence about the career choice that has been made. Such tailored career guidance programs are especially crucial for DHH students studying in special schools, given their limited experience in communication and social interactions.

The present study has some limitations considering the sampling methodology. It could be regarded as an exploratory study offering the basis for the design of more empirical studies involving DHH students from different regions worldwide, taking into consideration their ethnicity and culture. It will allow us to clarify and generalize conclusions for the population of deaf and hard-of-hearing high school pupils who attend special schools.

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Stručna (profesionalna) spremnost gluvih i nagluvih srednjoškolaca u specijalnom obrazovanju

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Uvod: Uspešna karijera je jedan od ključnih faktora koji obezbeđuju smislenu socijalnu integraciju osoba sa invaliditetom. S obzirom na to da adolescenti biraju struku odmah nakon završetka srednje škole, od vitalnog je značaja da se kroz programe stručnog usmeravanja u specijalnim školama efikasno rešavaju izazovi tipični za svaku vrstu invaliditeta. *Ciljevi*: Cilj ove studije je da ispita stručnu spremnost gluvih i nagluvih (GN) srednjoškolaca koji se školuju u specijalnim školama. *Metode*: Sprovedene su dve studije o stručnoj spremnosti, u kojima je učestvovalo ukupno 410 učesnika, uključujući GN učenike srednjih škola sa oštećenim sluhom (N = 205) i učenike bez oštećenja sluha (N = 205). *Rezultati*: Rezultati su ukazali na statistički pouzdane razlike u stručnoj spremnosti, intenzitetu naklonosti ka određenim strukama i rasponu profesionalnih oblasti interesovanja između GN učenika i njihovih vršnjaka koji čuju. Kvalitativni rezultati su, takođe, potvrdili ranija zapažanja o ranjivom položaju GN mladih pri izboru karijere. *Zaključak*: Identifikovani izazovi vezani za stručnu spremnost među GN učenicima srednjih škola omogućili su nam da opravdamo hitne mere za njihovo stručno usmeravanje, uključujući samosvest, svest o stručnim domenima i tržištu rada, kao i mogućnost usklađivanja individualnih zdravstvenih problema sa zahtevima zanimanja.

Ključne reči: stručno usmeravanje, stručna (profesionalna) spremnost, srednjoškolci, oštećenje sluha.

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Insights into families of children with selective mutism

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Introduction. Selective mutism (SM) is an anxiety disorder marked by persistent failure to speak in specific social situations despite normal speech in others. Research suggests a multifactorial aetiology involving temperament, genetic, neurodevelopmental, and environmental influences, with families playing a significant role. *Aim*. This study examined parental personality traits and family environmental factors in 30 mothers of children with SM. *Method*. Data were collected using a structured questionnaire and the IPIP-NEO-120 inventory. *Results*. Parents most often described themselves in childhood as quiet, shy, or withdrawn, traits commonly observed in their children. On the personality scale, they scored highest on agreeableness and conscientiousness and lowest on neuroticism. Families were described as sociable but primarily within close family circles. Nearly three-quarters of children had experienced at least one environmental risk factor, most often relocation. *Conclusion*. Findings highlight the importance of familial characteristics in understanding SM and suggest implications for targeted support and intervention.

Keywords: selective mutism, parental personality traits, family risk factors

Introduction

Selective mutism (SM) is an anxiety disorder characterised by a persistent inability to speak in specific social situations despite normal speech in others (American Psychiatric Association, 2014). According to DSM-5,

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symptoms must persist for at least one month, interfere with social or academic functioning, and not be better explained by a communication disorder. Children with SM typically avoid interaction due to fear of embarrassment or negative judgment, showing somatic and behavioural signs of anxiety such as physical tension and avoidance of eye contact (Cohan et al., 2006; Oerbeck et al., 2019; Schwenck et al., 2022). Non-verbal strategies such as gestures or writing are often used to communicate needs (Manassis et al., 2007). Prevalence estimates range between 0.1% and 2.2% depending on sample and diagnostic approach (Hua & Major, 2016). Onset is usually between ages two and five, though difficulties often become evident only at preschool or school entry (Johnson & Wintgens, 2001; Muris & Ollendick, 2015).

A number of studies have further described the behavioural and emotional patterns typical of SM. Children often speak fluently at home, in the presence of close family members, but remain silent in unfamiliar or evaluative settings such as school or kindergarten (Dimoski, 2016; Johnson & Wintgens, 2001). They tend to avoid being the centre of attention and may show visible physiological signs of anxiety when expected to speak, such as blushing, muscle tension, or avoidance of eye contact (Dow et al., 1995; Standart & Le Couteur, 2003). Older children frequently describe a sensation of a "lump in the throat" that prevents them from speaking (Crundwell, 2006; Oerbeck et al., 2019). Although verbal expression is inhibited, communication through non-verbal means (e.g., gestures, nodding, or writing) remains intact (Manassis et al., 2007; Nieves et al., 2012).

Prevalence rates vary across studies, ranging from 0.11% to 2.2% (Hua & Major, 2016), with some reporting a higher frequency among girls (Dummit et al., 1997; Kristensen, 2000), while others find higher rates among boys (Elizur & Perednik, 2003; Karakaya et al., 2008). Symptoms typically emerge between ages two and five, a period marked by the child's increasing social engagement outside the home (Johnson & Wintgens, 2001; Muris & Ollendick, 2015), but may be misinterpreted as shyness until school entry (Kumpulainen et al., 1998).

Aetiology of Selective Mutism

Current evidence suggests SM is multifactorial, arising from genetic, temperamental, neurodevelopmental, and environmental factors (Muris et al., 2016). Parents of children with SM frequently recall being shy or withdrawn in their own childhood (McHolm et al., 2005; Steinhausen & Adamek, 1997), and reduced verbal expressiveness has been documented in both mothers and fathers (Remschmidt et al., 2001). Parental shyness and social anxiety are also more common relative to controls (Kristensen & Torgersen, 2001). Personality studies have indicated higher neuroticism and lower openness in these parents (Chavira et al., 2007). These findings support the hypothesis of inherited temperamental traits increasing vulnerability to SM.

Family studies have consistently shown an overrepresentation of anxiety-related traits among relatives of children with SM. For instance, Steinhausen and Adamek (1997) reported silence as a recurring personality feature across up to three generations, while Remschmidt et al. (2001) found mutistic traits in 44% of mothers and 51% of fathers of affected children. Kristensen and Torgersen (2001) observed that 39% of mothers and 32% of fathers of children with SM reported shyness or social anxiety, compared to 4% and 1% in control families. These findings reinforce the idea that familial temperament patterns may represent both a genetic and learned risk pathway.

Environmental influences are also important. Children may model avoidance from parents uncomfortable in social contexts (Scott & Beidel, 2011). Some studies described SM families as emotionally restrained or with limited communication (Meyers, 1984; Rosenberg & Lindblad, 1978), though results are inconsistent (Ford et al., 1998). Overprotective or highly involved parenting has been suggested as a risk factor (Alyanak et al., 2013), while other work found no significant differences in parenting approaches (Cunningham et al., 2004). Further studies have also linked family stressors — such as frequent residential relocations, divorce, or changes in school environment — to the onset or exacerbation of SM symptoms (Dow et al., 1995; Kristensen, 2000). In some cases, families report significant emotional tension, conflict avoidance, or limited expression of feelings (Rosenberg & Lindblad, 1978; Vecchio & Kearney, 2005), although not all research supports these findings (Ford et al., 1998). This inconsistency highlights the need to study family context and parental personality within the same framework, as explored in the present study.

While previous studies have examined either parental personality or family characteristics separately, few have investigated these domains together in families of children with SM. The present study, therefore, aims to explore both the personality traits of mothers of children with SM and the environmental and social characteristics of their families, in order to identify common patterns that may contribute to the child's developmental context. Based on previous findings, it was hypothesized that most mothers would retrospectively describe themselves as shy, quiet, or withdrawn during childhood. We also expected that, on the IPIP-NEO-120, mothers would show lower Extraversion and Openness and higher Neuroticism compared to the remaining personality domains, consistent with existing literature on parents of children with SM. Furthermore, it was hypothesized that families would report social networks oriented primarily toward close family members and a few close friends rather than broader social groups. Finally, we expected that a substantial proportion of families would have experienced at least one environmental stressor, most commonly residential relocation.

Methods

Participants

Thirty biological mothers of children with Selective Mutism (SM) (Mage = 38.9, SD = 5.79, range = 30 - 48) participated in the study. Inclusion criteria were: (1) a confirmed diagnosis of SM in the child according to DSM-5 criteria, and (2) diagnosis verified by a psychiatrist or psychologist and documented in medical records. Exclusion criteria included comorbid neurodevelopmental or psychotic disorders (e.g., autism spectrum disorder, intellectual disability, schizophrenia). The children were aged between 4 and 13 years (Mage = 6.73, SD = 3.54). The sample consisted of 17 girls and 13 boys. Most mothers had completed higher education. Participants were recruited through the Teaching and Clinical Center of the Faculty of Education and Rehabilitation Sciences, two kindergartens, and two elementary schools. Only mothers were included, reflecting their primary role in professional contacts regarding their child's condition (See Table 1).

Table 1

Sociodemographic Characteristics of Mothers and Their Children with Selective Mutism (SM)

Variable	Category	n (%)	M (SD)	Range
Mothers (N = 30)				
Age (years)	—	—	38.9 (5.79)	30 – 48
Education level	Secondary school	12 (40.0%)		
	University degree	16 (53.3%)		
	Doctorate	2 (6.7%)		
Children (N = 30)				
Age (years)	—	—	6.73 (3.54)	4 – 13
Gender	Girls	17 (56.7%)		
	Boys	13 (43.3%)		

Note. N = total sample size; n = number of participants; M = mean; SD = standard deviation.

Instruments

Two instruments were used in this study: a structured questionnaire constructed for the purposes of this research and the standardized International Personality Item Pool–NEO-120 (IPIP-NEO-120; Johnson, 2014).

The first instrument, a structured questionnaire, was developed based on previous literature on families of children with Selective Mutism (SM). It contained 17 self-constructed questions designed to capture various family characteristics and contextual factors relevant to SM. The questionnaire was divided into four sections:

(1) Demographic information (e.g., age, education, and occupation of the mother, as well as age and gender of the child);
(2) Family structure and social relations (e.g., with whom and how often the parent spends time, social participation with relatives and friends, and preferred activities);
(3) Parental personality descriptors in childhood and adulthood, where parents were asked to self-describe using adjectives reflecting introversion or extraversion (Eysenck, 1994; McCrae & Costa, 1997); and
(4) Environmental risk factors, such as changes of residence, bilingualism, and parenting style.

The second instrument was the International Personality Item Pool–NEO-120 (IPIP-NEO-120; Johnson, 2014), a standardized personality questionnaire developed to assess the Five-Factor Model of personality. It consists of 120 items that measure 30 facets grouped under the five broad personality domains: *Neuroticism, Extraversion, Openness to Experience, Agreeableness,* and *Conscientiousness.* Each domain includes six facets with four items per facet. The items are presented as statements rated on a 5-point Likert scale (1 = completely false, 2 = mostly false, 3 = neither true nor false, 4 = mostly true, 5 = completely true). The IPIP-NEO-120 is a shortened and public-domain version of the IPIP-NEO-300 (Goldberg, 1999) and measures the same constructs as the NEO PI-R (Costa & McCrae, 1992). Example facets include *anxiety, anger, depression, self-consciousness, immoderation,* and *vulnerability* (Neuroticism); *friendliness, gregariousness, assertiveness, activity level, excitement-seeking,* and *cheerfulness* (Extraversion); *imagination, artistic interests, emotionality, adventurousness, intellect,* and *liberalism* (Openness to Experience); *trust, morality, altruism, cooperation, modesty,* and *sympathy* (Agreeableness); and *self-efficacy, orderliness, dutifulness, achievement-striving, self-discipline,* and *cautiousness* (Conscientiousness). The instrument shows high internal consistency, with Cronbach's alpha values ranging between .81 and .90 across domains (Johnson, 2014).

Procedure and Ethics

A convenience sample was used. Data were collected in collaboration with the Teaching and Clinical Center of the Faculty of Education and Rehabilitation Sciences (University of Zagreb), two kindergartens, and two elementary schools. Psychologists from these institutions identified and contacted parents of children with a documented diagnosis of Selective Mutism. Psychologists acted as intermediaries in distributing study information and the questionnaire link. All questionnaires were administered online via a secure survey platform, which included all study instruments for completion. Participants were informed about the study aims, anonymity, confidentiality, and voluntary participation. Written informed consent was obtained electronically prior to participation. All procedures adhered to the ethical standards of the Declaration of Helsinki.

Results

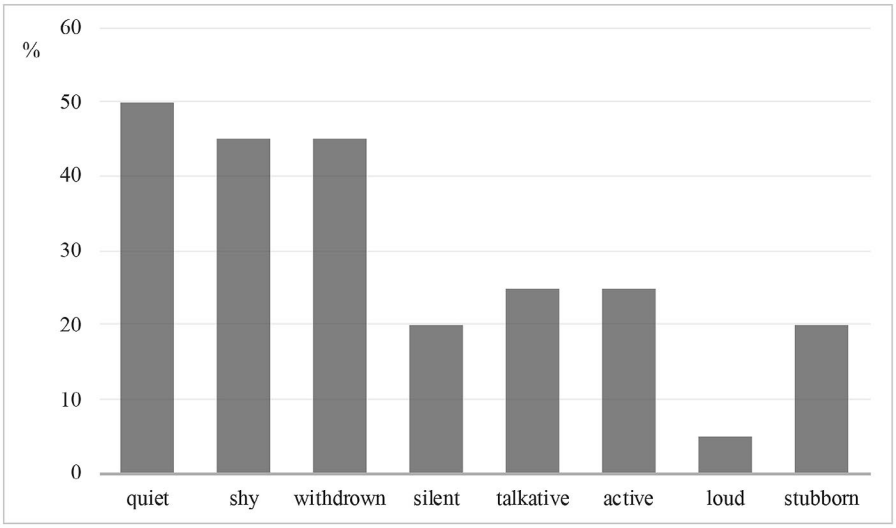
Data were analysed using IBM SPSS Statistics 29. Descriptive statistics are presented as means (*M*) and standard deviations (*SD*), and inferential statistics include repeated-measures ANOVA.

Parental Personality Traits in Childhood (H1)

Most mothers (60%, n = 18) described themselves as introverted in childhood, 30% (n = 9) as extraverted, and 10% (n = 3) as a combination of both. The most frequent descriptors were "quiet" (50%, n = 15), "shy" (45%, n = 14), and "withdrawn" (45%, n = 14) (Figure 1).

Figure 1

Personal Characteristics of Parents in Childhood



Personality Traits in Adulthood (H2)

On the IPIP-NEO-120, parents scored highest on agreeableness and conscientiousness, and lowest on neuroticism (Table 2). A repeated-measures ANOVA showed significant within-subject differences, $F(4.145) = 51.56$, $p < .001$. Post hoc tests showed that Neuroticism was significantly lower than all other traits ($p < .001$), while Agreeableness was higher than Openness and Extraversion ($p < .001$).

Table 2

Descriptive Statistics for Main Personality Traits of the IPIP-NEO-120 Questionnaire

Personality traits	N	Min	Max	M	SD
Neuroticism	30	1.67	3.21	2.59	0.43
Extroversion	30	1.58	3.92	3.36	0.52
Openness to experience	30	2.08	4.08	3.37	0.53
Agreeableness	30	3.50	4.29	4.01	0.21
Conscientiousness	30	3.29	4.54	3.89	0.37

Note. N = number of participants; Min = minimum score; Max = maximum score; M = mean; SD = standard deviation.

At the facet level, Morality, Cooperation, and Altruism had the highest scores within Agreeableness, while Modesty had the lowest (Table 3). For Neuroticism, Anxiety, and Self-consciousness were highest, and Depression was lowest (Table 4).

Table 3

Descriptive Statistics for All Facets of the Agreeableness Domain

Agreeableness	N	Min	Max	M	SD
Trust	30	2.25	4.75	3.53	0.57
Morality	30	3.75	5.00	4.71	0.37
Altruism	30	3.67	5.00	4.42	0.45
Cooperation	30	3.75	5.00	4.43	0.42
Modesty	30	2.00	4.75	3.11	0.64
Sympathy	30	2.25	5.00	3.86	0.69

Note. N = number of participants; Min = minimum score; Max = maximum score; M = mean; SD = standard deviation.

Table 4

Descriptive Statistics for All Facets of the Neuroticism Domain

Neuroticism	N	Min	Max	M	SD
Anxiety	30	1.00	4.00	2.81	0.71
Anger	30	1.00	3.75	2.33	0.68
Depression	30	1.00	4.00	2.04	0.82
Self-consciousness	30	2.00	4.25	2.93	0.62
Immoderation	30	1.75	3.25	2.62	0.45
Vulnerability	30	1.75	3.50	2.80	0.56

Note. N = number of participants; Min = minimum score; Max = maximum score; M = mean; SD = standard deviation.

Family Structure and Social Relations (H3)

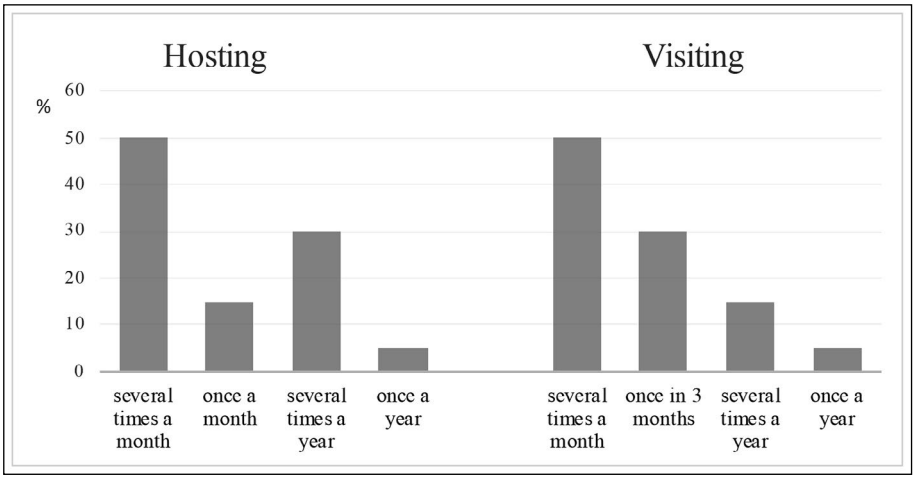
Most mothers (75%, n = 22) reported that they most enjoy spending their free time with a few close friends, while 65% (n = 19) preferred family members. A smaller proportion (15%, n = 5) preferred spending time in larger groups. Around 43% (n = 13) of mothers reported spending time with both close friends and family.

Regarding the frequency of socialising with friends outside the home, 35% (n = 11) met friends once a month, 30% (n = 9) once a week, and 15% (n = 5) three to four times a month. Ten percent (n = 3) met several times a week and 10% (n = 3) once every three months.

Half of the mothers (50%, n = 15) reported visiting relatives or friends with their family several times a month, 30% (n = 9) several times a year, and 15% (n = 5) once a month. Five percent (n = 2) did so once a year. The same distribution was observed for visits received by families (Figure 2).

Figure 2

Hosting and Visiting Relatives and Friends



Environmental Risk Factors (H4)

Of the total of 30 families, 22 (73%) had changed their place of residence during the child's life, while 8 (27%) had not. Among those who moved, 18 families moved within the same city, 9 moved once, 6 moved two or three times, and 7 moved from one city to another. None moved abroad. Only two families (7%) reported speaking another language in addition to Croatian at home. Regarding parenting style, most mothers (85%, *n* = 25) selected the statement "I set the rules and if my child breaks them, we try to talk about it and listen

to each other," indicating an authoritative style. Three mothers (10%) chose the statement representing a neglectful/uninvolved style, and two (5%) chose the statement corresponding to an authoritarian style.

Most parents, 85% (N=25), opted for the statement "I set the rules and if my child breaks them, we try to talk about it and listen to each other," which reflects an authoritative parenting style. 10% (N=3) of parents opted for the statement "I let my child do what they think is right," which reflects a neglectful or uninvolved parenting style. 5% of parents (N=2) chose the statement "I set the rules that must be followed and if my child breaks them, a punishment follows," which describes an authoritarian parenting style.

Discussion

Personality Traits of Parents of Children with Selective Mutism

As we expected, it was confirmed that most mothers would retrospectively describe themselves as shy, quiet, or withdrawn in childhood. The study found that more than half of the mothers (60%) described themselves as introverted in childhood, often using descriptors such as quiet, shy, or withdrawn. These results are consistent with earlier reports showing that parents of children with SM frequently share similar temperamental traits with their children (Kristensen & Torgersen, 2001; Shorer et al., 2023; Steinhausen & Adamek, 1997). Such overlap suggests potential heritable pathways, although causality cannot be inferred from this design. Some parents also described themselves as both introverted and extroverted depending on context, which may reflect situational variability rather than stable personality patterns.

In adulthood, mothers scored highest on agreeableness and conscientiousness and lowest on neuroticism. Elevated agreeableness, particularly in altruism, morality, and cooperation, indicates a strong orientation toward fairness and harmony, though lower trust and sympathy suggest a more selective expression of warmth. High conscientiousness is consistent with reports of parents being organized and involved, sometimes perceived as controlling or overprotective (Edison et al., 2011).

As we hypothesized, predicting lower extraversion and openness and higher neuroticism was only partially supported, as mothers scored lowest on neuroticism but highest on agreeableness and conscientiousness. The finding of low neuroticism diverges from earlier studies reporting heightened anxiety in SM parents (Chavira et al., 2007). Given reliance on self-report, social desirability bias is a likely explanation, particularly as no lie scale was included. Moreover, while the global neuroticism score was low, anxiety and self-consciousness facets were relatively higher, indicating that aggregated scores may mask clinically relevant tendencies. This highlights the need for

more nuanced tools and multi-informant methods in future research. These findings should also be interpreted within the cultural context of the sample. In Croatian culture, as in many Central and Eastern European contexts, social desirability and modesty in self-reporting are common, particularly in relation to emotional expression and parenting. This may further contribute to lower reported neuroticism and higher conscientiousness.

Finally, low openness and extraversion suggest a preference for routine and close social environments. While this may reflect genuine temperament, it could also be an adaptive response to the demands of raising a child with SM. Interpretations beyond these data – such as cultural generalizations – should be made cautiously. Although most findings are in line with previous reports of introversion and shyness in parents of children with SM, the contribution of this study lies in simultaneously examining both parental personality traits and family stressors. This combined perspective provides additional insight into how parental temperament and family circumstances may jointly shape the developmental context of SM.

Family Structure and Social Relations

As expected, expecting families to report close and limited social networks was confirmed. Most parents preferred spending time with family and a few close friends rather than large groups, and about half reported frequent visits with relatives or friends. These findings align with earlier descriptions of SM families as somewhat socially restrained (Meyers, 1984; Vecchio & Kearney, 2005). However, without a control group, it is unclear whether these social patterns are specific to SM or reflect broader family norms. Caution is needed in generalizing beyond the current small, convenience sample.

Exposure to Familial Environmental Risk Factors

As we expected, predicting that a substantial proportion of families would have experienced at least one environmental stressor was confirmed. Nearly three-quarters of families had moved residence at least once, and some multiple times. For temperamentally shy children, relocation can be a major stressor, consistent with earlier findings linking environmental transitions to SM onset (Ford et al., 1998; Kristensen, 2000). In this sample, moves were primarily local rather than cross-national, yet still represented disruption in familiar contexts. The study design, however, did not capture whether moves occurred before or after symptom onset – an important limitation for causal interpretation.

Bilingualism, previously suggested as a potential risk factor (Elizur & Perednik, 2003), was rare in this group (2 families only). Parenting style was most often reported as authoritative, generally considered protective (Bornstein, 2002). While this may indicate adaptive parental practices, self-report bias again raises concerns, especially as socially desirable responses were most consistent

with authoritative descriptors. A multi-method assessment of parenting is needed to validate these findings. Frequent residential relocations reported in this sample highlight the relevance of family stressors and suggest that models of SM aetiology should more explicitly consider the interaction between environmental disruptions and children's temperamental vulnerability.

Limitations

Several methodological issues restrict the interpretation of results. First, the sample was very small (N = 30), homogeneous, and recruited through convenience methods, reducing generalizability. Second, only mothers participated, although paternal traits may also play a significant role (Kristensen & Torgersen, 2001). Third, the absence of a control group prevents determination of whether the observed personality and family features are unique to SM or reflect broader patterns. Fourth, reliance on self-report questionnaires, without a lie scale or external ratings, substantially increases the risk of social desirability bias. Scores were highest where socially desirable (agreeableness, conscientiousness) and lowest where undesirable (neuroticism), reinforcing this concern. Also, the breadth of the questionnaire limited exploration of contextual details, such as whether relocation preceded or followed SM onset. These constraints significantly limit causal inferences and should be addressed in future studies with larger, more diverse, and controlled samples. In addition, the exclusive focus on mothers, while reflecting their central role in clinical and educational contacts, limits the ability to draw conclusions about paternal contributions. Similarly, the absence of a control group precludes determining whether the observed characteristics are specific to SM families or reflect broader parenting patterns. Retrospective self-report of parental childhood traits also represents a validity limitation, although no standardized instruments are currently available for this purpose. Nevertheless, given the rarity of SM, the present convenience sample provides a valuable exploratory step, offering descriptive insights that may guide the design of more robust studies.

Conclusion

This study explored parental personality traits and family characteristics among mothers of children with SM. Results suggest common patterns: introversion in maternal childhood, high agreeableness and conscientiousness and low neuroticism in adulthood, restricted social networks oriented toward close family and friends, and frequent residential relocations. While these findings align with previous research, they should be interpreted cautiously.

The study's limitations – small sample, absence of fathers, lack of control group, and reliance on self-report without validity checks – significantly constrain generalizability. Future research should address these gaps through

larger and more representative samples, inclusion of both parents, use of control groups, and multi-method approaches that reduce bias.

Despite these limitations, the study offers preliminary evidence that parental temperament (e.g., introversion, social withdrawal) in combination with family stressors (e.g., frequent relocations) may shape the context in which SM develops. While findings largely confirm what has been reported previously, their contribution lies in integrating parental traits and family circumstances within the same framework. This integrative approach highlights the need for etiological models of SM to consider the interaction of individual and contextual factors.

Clinically, these results underscore the importance of family-based interventions that address both the child's anxiety and the parents' interaction patterns. Supporting parents in managing their own anxiety, enhancing communication within the family, and fostering gradual social exposure in everyday contexts may enhance treatment outcomes for children with SM. Psychoeducation for parents and collaboration with educators could also reduce stress and improve consistency across home and school environments. Moreover, therapeutic approaches that include parental coaching and family sessions may help modify overly protective or controlling interaction styles often observed in SM families. Strengthening parental self-efficacy and encouraging balanced emotional expression could further promote adaptive coping within the family system. Integrating these strategies within multidisciplinary treatment plans–combining psychological, educational, and environmental interventions–may improve both child and family functioning. Ultimately, these results should be viewed as hypothesis-generating and underscore the importance of larger, longitudinal, and controlled studies that can more definitively test these associations.

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Uvid u porodice dece sa selektivnim mutizmom

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Uvod: Selektivni mutizam (SM) je anksiozni poremećaj koji karakteriše stalna nemogućnost govora u specifičnim društvenim situacijama, uprkos normalnom govoru u drugim. Istraživanja ukazuju na multifaktorsku etiologiju, koja uključuje temperament, genetske, neurorazvojne i uticaje okoline, pri čemu porodice imaju značajnu ulogu. *Cilj*: Ova studija ispitivala je osobine ličnosti roditelja i faktore porodičnog okruženja kod 30 majki dece sa SM. *Metod*: Podaci su prikupljeni korišćenjem strukturiranog upitnika i inventara IPIP-NEO-120. *Rezultati*: Roditelji su se u detinjstvu najčešće opisivali kao tihi, stidljivi ili povučeni, osobine koje se često primećuju i kod njihove dece. Na skali ličnosti postigli su najviše rezultate na slažljivosti i savesnosti, a najniže na neuroticizmu. Porodice su opisane kao društvene, ali prvenstveno u okviru bliskih porodičnih krugova. Skoro tri četvrtine dece iskusilo je barem jedan faktor rizika iz okoline, najčešće preseljenje. *Zaključak*: Rezultati ističu važnost porodičnih karakteristika u razumevanju SM i sugerišu implikacije za ciljanu podršku i intervenciju.

Ključne reči: selektivni mutizam, osobine ličnosti roditelja, faktori porodičnog rizika

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Challenges in the application of didactic-methodical procedures in inclusive teaching

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Introductions. Numerous factors are associated with the successful implementation of educational inclusion, and educators need to provide adequate support to students with disabilities while dealing with many challenges along the way. *Aim.* The aim of this research was to determine the relationship between work experience, attitude towards inclusion, perceived institutional support, self-assessed professional competences, job stress, and job satisfaction with the implementation of adequate didactic-methodical procedures in the inclusive work environment. *Methods*: The study included 309 primary school teachers from various parts of Croatia who had experience educating students with disabilities, with 181 of them teaching students with disabilities at the time. For the purpose of the research, a questionnaire was designed and used to gather participants' basic socio-demographic data, their assessment of inclusive educational practices (adjustment of didactic-methodical procedures in the classroom), institutional support, perceived competence for working with students with disabilities, attitudes towards inclusion, their job stress, and job satisfaction. *Results*. The statistical analysis of the gathered data revealed that the selected variables accounted for 25.4% of the variance in the application of adequate didactic-methodical procedures in inclusive classrooms. Self-assessed professional competence and job satisfaction were identified as significant positive predictors. Although perceived institutional support and attitudes towards

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Note: This paper is the result of the institutional project *"Didactic-methodical difficulties in classroom teaching with students with special educational needs"* (IP-ODHZ-11-2021), conducted at the Department of Social Sciences and Humanities, University of Slavonski Brod, Croatia.
The results of this study (summary) were presented at the 10th International Conference: Research in Education and Rehabilitation - ERFCON 2023 as a poster presentation.

inclusion were significantly positively correlated with the use of adequate didactic-methodical procedures, they were not significant predictors in the regression model. *Conclusion*. Findings of this research make a significant contribution to understanding factors influencing working in an inclusive environment in Croatian schools beyond teachers' attitudes towards inclusion, which are most frequently researched.

Keywords: institutional support, predictors of inclusive practice, professional competences, students with disabilities, teachers

Introduction

Inclusive education aims to transform school structures to ensure equal educational opportunities for all students (Felder, 2021). It is defined as a process that promotes the participation of every student in the school environment while preventing the exclusion of any child from the culture, curriculum, and community of mainstream schools. Students with disabilities represent a highly heterogeneous group, as their challenges in achieving academic success vary depending on the nature and severity of their difficulties, as well as the impact these difficulties may have on social interactions. Inclusive education, therefore, entails recognizing differences while emphasizing similarities among all students in the classroom, with the goal of fostering interpersonal connections and a sense of security (Skočić Mihić et al., 2016). Furthermore, inclusive education should ensure that schools have the necessary support and resources to enable all students to learn. This approach underscores the importance of embracing diversity and creating an environment in which all children feel accepted and encouraged (Florian et al., 2010; Hsien et al., 2009). Livazović et al. (2015) stress the significance of an inclusive approach that focuses on students at risk of marginalization, discrimination, or exclusion, recognizing the need for targeted support to guarantee equal opportunities for learning and participation in the educational process.

Research indicates that teachers often exhibit reluctance and a perceived lack of competence in supporting students with disabilities, particularly those with developmental disorders (Kudek Mirošević & Jurčević-Lozančić, 2014; Spratt & Florian, 2013). Kefallinou et al. (2020) emphasize that teacher professional development is a crucial factor in implementing inclusive practices both at the school and classroom levels. For instance, Nührenbörger et al. (2025) found that after participating in combined online and workshop-based training, teachers demonstrated improved attitudes and greater confidence in their ability to teach mathematics inclusively. A comprehensive analysis of attitudes and experiences regarding the inclusion of students with autism spectrum disorder in Croatia reveals that teachers with higher levels of education and more work experience tend to hold more positive attitudes. Conversely, teaching assistants are frequently insufficiently trained and rarely involved in lesson planning,

which can heighten feelings of insecurity when implementing inclusion (Pahić & Borak, 2025). These shortcomings may stem from inadequate teacher education and training in inclusive practices, limited resources and support within school systems, and insufficient awareness and understanding of the diverse needs of student populations. Cook et al. (2007) report that teachers often express positive attitudes toward inclusive education, suggesting an acknowledgment of its importance. However, the same study found that these teachers frequently doubt the potential benefits of inclusion and rarely implement the necessary pedagogical adjustments to support students with disabilities. Forlin and Chamber (2011) note that greater knowledge of legislation and the obligation to include all children in mainstream schools does not necessarily enhance teachers' readiness to teach students with disabilities, whereas specialized education in this field contributes to more positive attitudes toward inclusion. Similarly, Hemmings and Woodcock (2011) observe that many novice teachers feel inadequately prepared by their initial education to work effectively with students with disabilities.

Increasing attention has been directed toward examining teachers' self-efficacy in working with students with disabilities. Research consistently demonstrates that teachers play a pivotal role in the successful implementation of inclusive education (Forlin et al., 2010; Marković, 2022). Bandura (1997) defines teachers' self-efficacy as their belief in their own capacity to plan, organize, and execute actions necessary for educational tasks. This construct is influenced by multiple factors, including teachers' formal education, professional development, work experience, and susceptibility to emotional burnout. According to Stančić et al. (2014), effective inclusive education requires teachers to possess self-awareness, be familiar with diverse teaching strategies, understand different learning styles, and engage in continuous professional growth. Knowledge of learning styles enables teachers to identify individual differences among students and adapt instructional approaches to accommodate diverse needs. Furthermore, ongoing development of professional skills allows teachers to respond effectively to environmental changes and evolving student requirements, thereby enhancing their ability to support all learners. Teacher self-efficacy is shaped by individual characteristics such as values, motivation, self-confidence, and readiness to overcome challenges, as well as contextual factors (Valenčić Štembergar & Lepečnik Vodopivec, 2016). Mohamed Emam and Al-Mahdy (2020) confirm that teachers with high self-efficacy tend to experiment with varied teaching materials and approaches, implementing progressive and innovative strategies to improve learning outcomes, particularly in inclusive classrooms. Formal education and targeted professional development in inclusive education can significantly enhance teachers' self-efficacy under inclusive conditions (Livazović et al., 2015). Numerous scholars emphasize the necessity of teacher education and training in inclusive practices to ensure

that educators understand the needs of diverse learners and are equipped with appropriate tools, strategies, and methodologies to support classroom diversity (Fazlagić & Kolić, 2018; Kuyini et al., 2020; Lopes & Oliveira, 2021). Sharma et al. (2012) argue that teachers who demonstrate competence in applying effective instructional strategies, collaborating with colleagues, and managing inappropriate behavior patterns are more likely to succeed in inclusive teaching. Although research on the direct correlation between teachers' self-efficacy and participation in professional development programs remains limited, evidence suggests that ongoing professional development positively influences perceived self-efficacy (Fišer & Kałdonek-Crnjaković, 2022; Kałdonek-Crnjaković & Fišer, 2021; Kałdonek-Crnjaković et al., 2025; Powell-Moman & Brown-Schild, 2011; Rimm-Kaufmann & Sawyer, 2004; Ross & Bruce, 2007; Savolainen et al., 2012; Sharma et al., 2014; Sharma et al., 2024). Findings from numerous studies indicate that many teachers possess limited knowledge and understanding of children with disabilities, which often results in negative attitudes toward teaching these students in mainstream classrooms (DeBoer et al., 2011; Kotor et al., 2023). Several studies underscore the positive impact of initial education focused on competencies for working with children with disabilities, both in fostering favorable attitudes toward educational inclusion and in strengthening self-efficacy for inclusive teaching (Avramidis & Norwich, 2002; Burke & Southerland, 2004; Sharma et al., 2006). In a study by Fišer and Kałdonek-Crnjaković (2021), many participants described students with dyslexia as diligent, motivated, and engaged, while portraying themselves as "advocates for students with dyslexia." The findings also suggest that teachers' lack of an agentic position stems from insufficient knowledge of effective instructional strategies, as previously noted in large-scale studies, which consequently leads to low self-perceived efficacy and inadequate preparedness (Fišer, 2019; Kormos & Nijakowska, 2017; Nijakowska et al., 2018).

Research on inclusive education from teachers' perspectives has predominantly examined prior education and professional development (Fišer, 2019; Marković, 2022; Stamović, 2019). Work experience has also been shown to correlate with the beliefs of both pre-service and in-service teachers regarding teaching students with disabilities. Evidence suggests that experience in working with children with disabilities positively influences teachers' perceptions of their own self-efficacy (Burke & Sutherland, 2004; Hastings & Oakford, 2003). According to Martan et al. (2016), teachers who have worked with students with disabilities for more than five years, completed relevant courses, volunteered to teach these students, independently identified their needs and challenges, and adapted assessment methods to monitor progress tend to provide greater support and employ modified teaching techniques more frequently. Skočić Mihić et al. (2016) found that, compared to older colleagues with more teaching experience, teachers under the age of 40 and those with less

than 20 years of experience expressed stronger agreement with statements that inclusive education benefits both students with and without disabilities. Similar findings were reported regarding course attendance during higher education: teachers who attended courses related to inclusion and teaching students with disabilities were more likely to agree that inclusion benefits all students than those who had not received such training.

The relationship between the educational success of students with disabilities and teachers' emotional burnout has also been the focus of considerable research. Low self-efficacy can significantly contribute to stress and burnout among teachers (Skaalvik & Skaalvik, 2010; Weissenfels et al., 2021), which in turn negatively affects their motivation to work with students with disabilities and impacts student achievement (Mojavezi & Tamiz, 2012). Conversely, teachers' job satisfaction has been associated with improved student outcomes, not only due to higher-quality and more motivated teaching but also because satisfied teachers devote additional attention to ensuring the success of each student (Hoque et al., 2023) and foster high-quality teacher-student interactions (Harrison et al., 2023). Teachers who report greater job satisfaction are less likely to leave the profession, exhibit lower absenteeism, and maintain positive classroom relationships, providing emotional support, effective classroom management, and appropriate instructional assistance (Wartenberg et al., 2023).

Aim

The aim of this study was to examine the relationship between work experience, attitudes toward inclusion, perception of institutional support, self-assessed professional competencies, job stress, and job satisfaction with the application of didactic-methodical procedures in inclusive teaching. Based on previous research, it is expected that teachers with greater work experience, more positive attitudes toward inclusion, higher perceived institutional support, stronger self-assessed competencies, lower levels of job stress, and higher job satisfaction will be more likely to implement instructional adjustments when teaching students with disabilities.

Methods

Participants and procedure

Participants in this study were 309 primary school teachers (96.4% female) with experience working with students with disabilities, 181 of whom were currently including students with disabilities in their classes. Teachers ranged in age from 24 to 64.5 years (M = 45.60, SD = 9.97) and had between 1 and 41 years of work experience (M = 20.56, SD = 10.54). Participants represented all Croatian counties, with the largest

proportion from Slavonia (Brodsko-Posavska County 32.4%, Osječko-Baranjska County 13%, and Vukovarsko-Srijemska County 9.2%), followed by the City of Zagreb (13%) and Zagreb County (11.4%).

Data were collected online via Google Forms as part of the broader research project *"Didactic-methodical difficulties in classroom teaching with students with special educational needs"* (IP-ODHZ-11-2021), conducted at the Department of Social Sciences and Humanities, University of Slavonski Brod, Croatia. The questionnaire link, accompanied by an invitation to participate, was distributed by email to principals and professional associates of numerous primary schools across Croatia, with a request to forward it to classroom teachers. Participation in the study was voluntary and anonymous. Anonymity was ensured by not collecting any directly identifying information (such as names, email addresses, or institutional identifiers). The survey platform used did not collect IP addresses and participant login was not required, ensuring that individual responses could not be linked to specific participants. Responses were stored in aggregated form and accessed only by the research team for analysis purposes.

Instrument

A two-part online questionnaire was developed for the purposes of the aforementioned research project. The first part collected data on basic socio-demographic characteristics (e.g., gender, age, education, work experience), job stress (assessed with one item on a scale from 0 – not at all stressful to 3 – very stressful), and job satisfaction (assessed with one item on a scale from 0 – not at all satisfied to 4 – very satisfied). It also examined teachers' experience in working with students with disabilities (one yes/no item for previous and current experience), followed by an open-ended question asking respondents to indicate the type(s) of disability their student(s) had or currently have.

The second part of the questionnaire included a modified version of the *Questionnaire on the Assessment of Inclusive Educational Practice in the Preschool and Primary Education System* (Kudek Mirošević & Jurčević Lozančić, 2014), consisting of 23 items grouped into four subscales: application of didactic-methodical procedures (5 items, $\alpha = .87$), attitudes toward inclusion (7 items, $\alpha = .87$), self-assessed professional competences (5 items, $\alpha = .71$), and perceived institutional support (6 items, $\alpha = .87$). Participants rated their agreement with each item on a five-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree).

Data analysis

To address the research objective, we conducted the following data analyses: analysis of descriptive statistics of all measured variables (minimum and maximum obtained values, mean, standard deviation, skewness, and kurtosis), Pearson correlation analysis, and linear regression.

Results

Descriptive statistics (Table 1) showed that all variables had negatively skewed distributions and relatively high average results (compared to the maximum possible values), meaning that teachers tend to positively evaluate their attitudes toward inclusion, professional competences, perceived institutional support, job satisfaction, and especially how they apply didactic-methodical procedures when working with children who have disabilities, while they also report relatively high levels of job stress.

Table 1

Descriptive statistics of all measured variables (N = 309)

	Min	Max	M	SD	Skewness	Kurtosis
Work experience	1.00	41.00	20.56	10.54	-0.18	-1.04
Application of didactic-methodical procedures	1.60	5.00	4.48	0.54	-1.27	2.57
Attitude towards inclusion	1.00	5.00	3.22	0.84	-0.34	0.12
Professional competences	1.00	5.00	3.37	0.79	-0.31	-0.06
Institutional support	1.00	5.00	3.26	0.91	-0.19	-0.54
Job satisfaction	1.00	4.00	3.49	0.65	-1.17	1.48
Job stress	0.00	3.00	2.27	0.70	-0.59	-0.13

To examine the relationship between the teacher's work experience, attitude towards inclusion, perception of institutional support, self-assessed professional competences, job stress, and job satisfaction with the application of didactic-methodical procedures in the workplace, correlational and regression analyses were conducted. Based on the recommendations by Kline (2011), the absolute values of skewness less than 3 and kurtosis less than 10 are considered acceptable when testing the normality of distribution, and therefore, the use of parametric analyses was justified.

Table 2

Correlations between all measured variables (N = 309)

		1	2	3	4	5	6
1.	Application of didactic-methodical procedures	1.00					
2.	Work experience	-.10	1.00				
3.	Attitude towards inclusion	.13*	-.02	1.00			
4.	Professional competences	.40**	.08	.29**	1.00		
5.	Institutional support	.24**	.02	.30**	.37**	1.00	
6.	Job satisfaction	.19**	.06	.31**	.18**	.29**	1.00
7.	Job stress	.01	.13*	-.17**	-.09	-.11	-.19**

*$p < .05$, **$p < .01$

Results shown in Table 2 point to statistically significant small to moderate correlations between the application of didactic-methodical procedures and the teacher's attitude towards inclusion, perception of institutional support, self-assessed professional competences, and job satisfaction, while the correlations with work experience and job stress were not significant.

Table 3

Results of regression analysis predicting application of didactic-methodical procedures

	B	SE (B)	β	*T*	*p*
Work experience	-.01	.00	-.17	-3.30	.00
Attitude towards inclusion	-.04	.04	-.06	-1.03	.30
Professional competences	.29	.04	.42	7.60	.00
Institutional support	.06	.03	.10	1.84	.07
Job satisfaction	.12	.04	.14	2.63	.01
Job stress	.04	.04	.06	1.12	.27
R			.504		
R^2			.254		
F(6,302)			17.144**		

*$p < .05$, **$p < .01$

The results of regression analysis (Table 3) showed that self-assessment of professional competences and job satisfaction were significant positive predictors, and work experience was a significant negative predictor of the application of didactic-methodical procedures, together explaining 25.4% of the variance of the application of didactic-methodical procedures. Considering that the work experience was not significantly correlated with the application of didactic-methodical procedures, it represents a suppressor variable in this model. The perception of institutional support and attitude towards inclusion did not prove to be significant predictors, although they were significantly correlated with the application of didactic-methodical procedures (Table 2). Teachers who more positively estimate their professional competences in working with students with disabilities and who are more satisfied with their jobs are more prone to applying adjustments to the teaching process when working with students with disabilities.

Discussion

The aim of this study was to examine the relationship between work experience, attitudes toward inclusion, perceived institutional support, self-assessed professional competencies, job stress, and job satisfaction with the application of didactic-methodical procedures in inclusive teaching. The

findings indicate that significant positive predictors of the application of didactic-methodical procedures when working with students with disabilities were self-assessed professional competence and job satisfaction. Teachers who rated their professional competencies for working with students with disabilities more positively and reported higher job satisfaction were more likely to implement adjustments in the teaching process. These results confirm the hypotheses regarding the importance of professional competence and job satisfaction for the effective application of didactic-methodical procedures. Although institutional support and attitudes toward inclusion were not identified as significant predictors in this study, their correlations with the adaptation of teaching procedures were statistically significant and aligned with expectations.

Previous research emphasizes that teachers must develop competencies that effectively promote the progress of students with disabilities to ensure support for all learners (Pantić, 2008), as evidence suggests that teachers often lack sufficient competence in this area (Kudek Mirošević & Jurčević Lozančić, 2014). Several authors (Igrić, 2015; Ivančić & Stančić, 2013) confirm that teachers are not adequately prepared to work with students with disabilities and require ongoing professional development to acquire additional competencies. Studies consistently show that teachers do not gain the necessary skills for working with students with disabilities to the required extent (Bouillet, 2013; Fišer, 2019; McHatton & McCray, 2007; Nikčević-Milković et al., 2019; Shade & Stewart, 2001; Sze, 2009). Given that instructional quality and continuous teacher training are key variables influencing students' academic achievement, these gaps likely reflect insufficient systemic support for teachers to acquire specialized competencies (Jurić, 2007). Consequently, one of the major challenges for the educational system is to provide opportunities for current and future teachers to gain the knowledge and skills necessary for the successful application of didactic-methodical procedures in inclusive teaching.

Findings of research conducted by Marković (2022) indicate that teachers who completed three or more courses on working with students with disabilities during their initial education reported the highest levels of self-efficacy in providing direct support to these students. Research further demonstrates that initial education and professional development in inclusive practices contribute to fostering positive attitudes toward inclusion (Sze, 2009), improving implementation success (Kudek Mirošević & Jurčević Lozančić, 2014), enhancing teachers' preparedness and confidence (Lakkala & Määttä, 2011), and strengthening their belief in their own teaching effectiveness (Bhatnagar & Das, 2013; Kałdonek-Crnjaković & Fišer, 2021). The importance of initial education and ongoing professional development for inclusive teaching is underscored in numerous studies (Fišer, 2019; Rakap & Kaczmarek, 2010; Strogilos & Tragoulia, 2013; Šarčević Ivić-Hofman et al., 2023). These findings highlight the need for teacher education programs to prioritize the recognition

and assessment of students' needs, as well as the planning and implementation of effective strategies and supports, while fostering collaboration with other professionals and parents in the development and execution of individualized education programs.

The perception of institutional support and attitudes toward inclusion did not emerge as significant predictors in this study, although both were significantly correlated with the application of didactic-methodical procedures. According to de Boer et al.'s (2011) review, most teachers hold neutral or unfavorable views toward inclusive education. Key factors influencing teachers' attitudes include their level of education, professional experience, and the type of students' disabilities. Research by Skočić Mihić et al. (2016) and Fišer and Kałdonek-Crnjaković (2021) suggests that negative attitudes toward inclusion often stem from insufficient competence in inclusive classrooms. Conversely, positive beliefs about the value of inclusive education can strongly influence teachers' willingness to implement instructional adaptations and foster an inclusive classroom climate. Therefore, alongside developing competencies for teaching in inclusive settings, it is essential to cultivate teacher beliefs that support inclusive values (Skočić Mihić et al., 2016).

Alila et al. (2016) emphasize that providing teachers with support through supervision by empowering and promoting new teacherhood, clarifying professional roles, and assisting with work-related challenges, facilitates both professional and personal growth in inclusive educational contexts. Additional support from educational rehabilitators has proven valuable in enhancing teachers' understanding of inclusive teaching and their ability to adapt instructional approaches to individual student needs. Vekić-Kljaić and Hanzec Marković (2023) confirm that institutional support is perceived as stronger in schools employing educational rehabilitators and psychologists. Similarly, Nikčević-Mikolčević et al. (2019) report that greater institutional support for working with students with disabilities is associated with improved methodological and didactic engagement among primary school teachers.

It is important to note that previous research has primarily focused on Croatian teachers' attitudes toward inclusive education. The present study contributes by examining additional aspects of inclusive practice, such as job satisfaction. Findings indicate that teachers who report higher job satisfaction are more likely to implement instructional adjustments when working with students with disabilities. A review of global empirical studies shows that, regardless of country, highly satisfied teachers consistently strive to support student success—not only through knowledge delivery but also by providing additional attention and care to help each student achieve better outcomes (Hoque et al., 2023). Research consistently demonstrates that job satisfaction is positively associated with instructional quality (Harrison et al., 2023) and high-quality teacher-student interactions, including emotional support, classroom

management, and instructional assistance. These interactions, in turn, are linked to improved academic outcomes such as enhanced motivation and achievement (Wartenberg et al., 2023).

This study has certain methodological limitations that should be addressed in future research. The generalizability of findings is constrained using a convenience sample, particularly in terms of size and composition. Since participants were primarily drawn from two Croatian counties, Brodsko-Posavska and Zagrebačka, the sample cannot be considered representative of all regions of the Republic of Croatia.

Conclusion

These findings have important implications for educational policy and practice, highlighting the need to strengthen the emphasis on inclusive education during initial teacher preparation and to ensure access to educational content that supports students with disabilities. The results may also encourage further research on strategies to improve teacher education so that it more effectively meets the needs of students with disabilities and facilitates their successful inclusion in the education system. Given the growing diversity of student populations, continuous professional development in inclusive education is becoming essential to guarantee equal opportunities for academic success for all learners. It is therefore crucial to promote and support such professional development initiatives to enhance inclusive practices and ensure comprehensive support for every student.

Recommendations for overcoming challenges in the application of didactic and methodological procedures in inclusive teaching:

- Adjust teaching content according to the capabilities and needs of each student.
- Use differentiated tasks and activities so that all students can actively participate in teaching.
- Use a combination of visual, auditory, and kinesthetic methods to enable better understanding of the material.
- Actively involve students in work through project tasks, teamwork, and experiential learning.
- Ensure cooperation with educational rehabilitators, speech therapists, and psychologists.
- Enable the work of teaching assistants for students who need additional support.
- Use digital tools and interactive content to facilitate learning.
- Prepare teaching materials in different formats (audio, video, images, simple text).

- Promote the values of tolerance, respect, and mutual support among students.
- Organize workshops and training for students and teachers on inclusion and diversity.
- Use formative assessment and adapt methods of knowledge assessment.
- Provide alternative ways of expressing knowledge (oral answers, practical tasks, presentations).
- Organize seminars and workshops on inclusive didactic and methodological approaches.
- Encourage the exchange of experiences among teachers and cooperation with inclusive professionals.

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Izazovi u primeni didaktičko-metodičkih postupaka u inkluzivnoj nastavi

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Uvod: Brojni faktori povezani su sa uspešnom implementacijom obrazovne inkluzije, a učitelji moraju da pruže adekvatnu podršku učenicima sa teškoćama dok se istovremeno na tom putu nose sa mnogim izazovima. *Cilj:* Cilj ovog istraživanja bio je da se utvrdi veza između radnog iskustva, stava prema inkluziji, percipirane institucionalne podrške, samoprocenjenih profesionalnih kompetencija, stresa na poslu i zadovoljstva poslom sa primenom adekvatnih didaktičko-metodičkih postupaka u inkluzivnom radnom okruženju. *Metode:* Studija je obuhvatila 309 nastavnika osnovnih škola iz različitih delova Hrvatske koji su imali iskustva u obrazovanju dece sa teškoćama, od kojih je 181 u to vreme predavao učenicima sa teškoćama. Upitnik je korišćen za prikupljanje osnovnih sociodemografskih podataka učesnika, njihove procene inkluzivnih obrazovnih praksi (prilagođavanje didaktičko-metodičkih postupaka u učionici), institucionalne podrške, percipirane kompetencije za rad sa učenicima sa teškoćama, stavova prema inkluziji, njihovog stresa na poslu i zadovoljstva poslom. *Rezultati:* Statistička analiza prikupljenih podataka pokazala je da odabrane varijable čine 25.4% varijanse u primeni adekvatnih didaktičko-metodičkih postupaka u inkluzivnim učionicama. Samoprocenjena profesionalna kompetentnost i zadovoljstvo poslom identifikovani su kao značajni pozitivni prediktori. Iako su percipirana institucionalna podrška i stavovi prema inkluziji bili značajno pozitivno povezani sa upotrebom adekvatnih didaktičko-metodičkih postupaka, nisu bili značajni prediktori u regresionom modelu. *Zaključak:* Rezultati ovog istraživanja značajno doprinose razumevanju faktora koji utiču na rad u inkluzivnom okruženju u hrvatskim školama, pored stavova nastavnika prema inkluziji koji se najčešće istražuju.

Ključne reči: institucionalna podrška, prediktori inkluzivne prakse, profesionalne kompetencije, učenici sa teškoćama, nastavnici

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Professionals' perspective on early intervention in Croatia: Comparing home- and center-based quality

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Introduction. Early intervention services play a crucial role in supporting children at risk of developmental difficulties and their families. In Croatia, early intervention can be delivered either in the family home or in specialized centers, yet little is known about how professionals perceive the quality of these service models. *Objectives*. This study examined professionals' perceptions of early intervention service quality, comparing home- and center-based provision, and explored whether perceptions varied according to professional experience, education, and frequency of service delivery. *Methods*. Sixty-seven professionals from across Croatia (91% female; median age = 32 years) participated. Median professional experience was 13 years, with 6 years in early intervention. Perceptions were assessed using an adapted Croatian version of the *Inventory of Quality in Early Intervention Centres*. Paired-samples *t*-tests compared home- and center-based ratings; regression analyses explored predictors of differences. *Results*. Overall quality ratings were significantly higher for home-based services (M = 3.9, SD = 0.54) than for center-based services (M = 3.6, SD = 0.30; p = .006, Cohen's dz = 0.36). The largest differences favored home provision in child and family engagement, collaboration with families, and parental competences (all $p < .001$). Professional experience and postgraduate specialization were not significant predictors, whereas frequency of home-based provision was (B = 0.154, p= .037). *Conclusion*. Professionals perceived home-based early intervention as higher in quality, particularly in fostering collaboration and family engagement. Greater exposure to home-based practice enhanced recognition of its benefits, underscoring the need to expand family-centered, home-based early intervention services within Croatia's social welfare system.

Keywords: early intervention, professional perceptions, service quality, family-centered practice

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Introduction

The birth of a child with developmental difficulties poses significant challenges for families, requiring parents to adapt to new roles and responsibilities and to seek appropriate services to support their child's growth and development (Lučić, 2019; Matthews et al., 2021; Milić Babić, 2010). The early years of life represent a particularly sensitive period across cognitive, motor, language, daily living, and socio-emotional domains, and timely interventions can mitigate developmental risks and improve long-term outcomes for both children and families (Spittle & Treyvaud, 2016). Early intervention (EI) is generally defined as a process of informing, advising, educating, and supporting young children at risk of developmental delay or already experiencing developmental difficulties, as well as their families (Ljubešić, 2008; Wrightslaw, 2008). Grounded in the concept of neuroplasticity, EI capitalizes on sensitive periods of brain development when targeted experiences can most effectively shape functional outcomes (Inguaggiato et al., 2017; Johnston, 2004; Mateos-Aparicio & Rodríguez-Moreno, 2019). Recent reviews from developmental neuroscience stress that EI programs capitalize on this time window of potential for change, aligning interventions with brain development to maximize outcomes for children at risk of or already experiencing developmental difficulties (Nelson et al., 2024). This perspective underscores the scientific rationale for prioritizing early and family-centered services, as they not only promote immediate developmental gains but also lay the foundation for long-term resilience and adaptive functioning (Hadders-Algra, 2021).

In Croatia, EI was formally introduced into the social welfare system in 2011 and is currently regulated by the Social Welfare Act (Zakon HR, 2022), which defines it as early developmental support. This service includes professional developmental support for the child and support for parents, delivered either in the family home (home-based support) or in institutional settings (center-based support), depending on the organization of local services, availability of professionals, and families' needs. In practice, many children receive a combination of home- and center-based services, although the intensity and frequency of home visits are often limited, commonly occurring once per week or less. Decisions regarding service setting are not based on standardized criteria but are influenced by regional resources, staffing capacity, and logistical factors. As a result, considerable variability exists across regions in terms of service availability, delivery models, and intensity of early intervention support (Validžić Požgaj, 2018; Vočanec et al., 2018).

International literature highlights the distinct advantages of different service settings. Home-based services, delivered in the child's natural environment, emphasize learning through daily routines, familiar interactions, and family participation, and are consistent with IDEA Part C recommendations (Bruder, 2010; Douglas et al., 2022; IDEA, 2018). Such approaches are often

associated with greater parent empowerment and opportunities for naturalistic learning. By contrast, center-based services provide structured environments, access to multidisciplinary expertise, and opportunities for controlled learning conditions and professional supervision, which may be particularly valuable for children with complex developmental needs (Dixon et al., 2017; Landy & Menna, 2006). Both approaches, therefore, offer unique benefits but also pose challenges in ensuring consistent support quality.

However, despite the growing body of international literature on family-centered and natural-environment practices, very little is known about how professionals themselves evaluate the quality of services across different settings. To our knowledge, no studies have systematically examined professionals' perspectives on home- versus center-based EI in Croatia, even though the system is marked by regional inequalities, staff shortages, and predominantly infrequent home visits. This gap is particularly important, as understanding professionals' views can inform improvements in service organization and policy to ensure equity and accessibility.

The quality and effectiveness of EI services depend not only on program structure or setting, but also on the competencies, attitudes, and experiences of the professionals delivering them. Skills such as effective communication, interdisciplinary collaboration, and the ability to empower parents are recognized as crucial in fostering positive developmental outcomes (Bouillet, 2010; Dunst et al., 2007; Moore, 2012; dos Santos et al., 2024). Recent research also indicates that professionals' perceptions of intervention quality can be shaped by their training background, exposure to different service models, and, especially, the length of their professional practice (Barton & Fettig, 2013; Damiano & Longo, 2021; Duraku et al., 2022). Yet, empirical evidence on these issues remains scarce, and most studies have focused primarily on parental experiences and child outcomes (Dunst & Espe-Sherwindt, 2016).

This gap is particularly evident in Central and Eastern European countries, where EI systems are still developing and often face limited resources, fragmented service delivery, and regional inequalities (Dobrova-Krol et al., 2019; Kosher & Gross-Manos, 2024). Exploring how professionals perceive the quality of services across different settings can therefore provide valuable insights into the strengths and shortcomings of current practices. Such knowledge is crucial not only for improving everyday professional practice but also for informing broader policy and ensuring that early intervention is equitable, accessible, and responsive to the needs of children and their families.

Aim

Building on this rationale, the present study examined how professionals in Croatia perceive the quality of EI services, with a particular focus on differences between home- and center-based provision. We also explored whether these perceptions vary according to professional background and practice characteristics, including professional experience, education (postgraduate specialization vs. university degree), and frequency of service provision. Taken together, these questions aimed to shed light on how professionals evaluate EI service quality across settings and whether their views are shaped by individual experience or systemic practice conditions.

Methods

Participants

The study sample consisted of professionals providing EI services in Croatia. Eligible participants were those who had experience delivering services both in family homes (home-based support) and in institutional settings (center-based support).

The professional profiles included special education teachers, speech and language therapists, psychologists, physiotherapists, and occupational therapists. The inclusion criterion was a minimum of six months of experience in early intervention.

Participants were recruited from institutions across Croatia that provide both home - and center - based EI, including the Centre for Rehabilitation Zagreb – Sloboština Branch, the Day Centre "Mali Dom Zagreb", the Centre for Education and Rehabilitation "Vinko Bek", the Polyclinic for Physical Medicine and Rehabilitation "Milena Stojčević Polovina", the Centre for Education and Rehabilitation "Slava Raškaj," Caritas of the Archdiocese of Zadar, the Centre for Education and Rehabilitation "Šubićevac," the Early Childhood Intervention Centre MURID, and the Centre for Neurodevelopmental Reflex Integration.

Measures

A standardized questionnaire, the Inventory of Quality in Early Intervention Centres (Romero-Galisteo et al., 2019), was used to assess professionals' perceptions of EI quality across service settings. The instrument was translated into Croatian and adapted, following standard forward–backward translation procedures and expert review. Items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The questionnaire covered seven dimensions of EI quality. It addressed the organizational characteristics of services, including weekly frequency, scheduling practices, and the flexibility to reschedule or replace sessions in case of cancellations. It further examined the quality of professional support, such as the appropriateness of

planned activities, monitoring of child progress, and the impact of travel on service delivery. Another focus was on child and family engagement, capturing the extent to which activities were feasible for parents, meaningful for children, and embedded in everyday routines, while also considering the involvement of other household members. Collaboration was assessed both in terms of cooperation with families and interdisciplinary teamwork, with emphasis on the clarity of information and coordination among professionals. In addition, the instrument explored professional competences, including knowledge, confidence in providing services, ability to adapt tasks to children's needs and family context, and initiative in planning. Perceptions of parent and caregiver competences were also included, reflecting how professionals viewed parents' ability to implement activities, communicate effectively, and use materials with their child. Finally, the questionnaire captured general satisfaction and future intentions, exploring professionals' overall attitudes toward EI, their willingness to recommend it, and their motivation to continue providing such services.

Professionals were asked to complete the questionnaire twice, once with reference to home-based EI services and once with reference to center-based services, rating the same set of items separately for each service setting.

In addition, a socio-demographic questionnaire collected information about participants' gender, age, profession, level of education, total years of professional experience, years of experience in EI, and geographical distance to service delivery sites.

Data collection

Data collection took place between April 2023 and June 2024. Institutions across different regions of Croatia that provide EI both in family homes and in institutional settings were contacted and invited to participate. When an institution agreed to take part, professionals employed there who were directly involved in delivering EI services received an invitation to participate. Those who expressed interest were provided with detailed information about the study aims and procedures, and written informed consent was obtained prior to completing the questionnaire. Participation was voluntary, anonymity and confidentiality were ensured, and the study was approved by the Ethics Committee of the Faculty of Education and Rehabilitation Sciences, University of Zagreb (Approval No. 251-74/22-02-7/2).

Statistical analysis

Data were analyzed using IBM SPSS Statistics (version 20). Descriptive statistics (medians, ranges, and frequencies) were calculated to summarize the sociodemographic and work characteristics of the sample and overall scores on the questionnaire domains.

Given that the same professionals evaluated both home-based and center-based EI services, within-subject comparisons were performed. Paired-samples *t*-tests were used to examine differences in perceived quality between service settings across

questionnaire domains. Effect sizes were reported using Cohen's *dz*, interpreted according to Cohen's (1988) guidelines (small = .20, medium = .50, large = .80).

To address the role of professional experience, linear regression analyses were conducted.

The difference score between home- and center-based ratings served as the dependent variable, with total years of professional experience and years specifically in EI entered as continuous predictors.

Two secondary factors were examined in separate regression models. Education level was entered as a binary predictor (0 = university degree, 1 = postgraduate specialization in EI), while frequency of service provision was entered as a continuous variable (number of weekly home- or center-based sessions). Effect sizes for regression models were reported using the coefficient of determination (R^2), with values of .02, .13, and .26 interpreted as small, medium, and large effects, respectively (Cohen, 1988).

A priori power analysis indicated that, to detect a medium within-subject effect (dz = 0.50) in paired-samples t-tests with 80% power at α = .05, a minimum of 34 participants was required. For regression analyses, at least 62 participants were needed to detect a moderate correlation (r = .35) with 80% power at α = .05 (Faul et al., 2007).

Statistical significance was set at $p < .05$ (two-tailed).

Results

Sample characteristics

A total of 67 professionals participated in the study (Table 1). The sample was predominantly female (n = 61), with only a small number of male participants (n = 6). The median age of participants was 32 years.

Table 1

Sociodemographic and work characteristics of participating professionals

Variable		N (%) or Median (Range)
Gender	Female	61 (91%)
	Male	6 (9%)
Age (Years)		32 (25–40)
Profession	Special education teacher	41 (61%)
	Psychologist	7 (10%)
	Physiotherapist	11 (17%)
	Occupational therapist	8 (12%)
Education	University degree	55 (82%)
	Postgraduate socialization in early intervention	12 (18%)
Total years of experience		13 (1–25)

Variable		N (%) or Median (Range)
Years of experience in early intervention		6 (1–15)
Frequency of home-based provision Provision	<1/week	35 (53%)
	1/week	25 (37%)
	2–3/week	7 (10%)
Frequency of center-based provision	<1/week	22 (33%)
	1/week	38 (57%)
	2–3/week	7 (10%)

In terms of profession, most participants were special education teachers (61%), followed by physiotherapists (17%), occupational therapists (12%), and psychologists (10%). The majority held a university degree (82%), while 18% of professionals had completed a postgraduate specialization in EI.

Participants reported a median of 13 years of overall professional experience and 6 years of experience specifically in EI. Service provision patterns showed that home-based services were most often provided less than once per week (52%) or once per week (37%), whereas center-based services were most often delivered on a weekly basis (57%).

Perceptions of service quality by setting

Professionals' ratings of EI quality across domains are presented in Table 2. In both home- and center-based services, the highest scores were observed for General satisfaction and Future intentions (home: $M = 4.4$; center: $M = 4.5$). The lowest ratings for home-based services were found in Service characteristics ($M = 3.4$), while for center-based services, the lowest scores were given to Child and family engagement, Collaboration with families and other professionals, and Parental competences (all $M = 3.2$).

Paired-samples *t*-tests revealed that perceptions of Child and family engagement, Collaboration with families and other professionals, and Parental competences were significantly higher in the home setting compared to the center (all $p < .001$). Effect sizes indicated medium to large differences ($dz = 0.48–0.66$). By contrast, no significant differences were found between settings for Service characteristics, Professional support, Professional competences, or General satisfaction (all $p > .05$). Importantly, the Overall quality rating was significantly higher for home-based services ($M = 3.9$, $SD = 0.54$) than for center-based services ($M = 3.6$, $SD = 0.30$; $t = 2.97$, $p = .006$), with a medium effect size (Cohen's $dz \approx 0.40$).

Table 2

Professionals' perception of early intervention service quality by setting

Domain	Home *M (SD)*	Center *M (SD)*	*T*	*P*	Cohen's *dz*
Service Characteristics	3.4 (0.63)	3.4 (0.52)	0.00	1.000	0.00
Professional support	3.8 (0.67)	3.6 (0.49)	1.05	.302	0.13
Child and family engagement	3.9 (0.65)	3.2 (0.61)	4.00	<.001	0.49
Collaboration with families and professionals	3.9 (0.77)	3.2 (0.74)	3.97	<.001	0.48
Professional competences	4.0 (0.61)	4.2 (0.33)	-1.38	.177	-0.17
Parental competences	4.1 (0.77)	3.2 (0.59)	5.43	<.001	0.66
General satisfaction and future intentions	4.4 (0.69)	4.5 (0.44)	-0.92	.363	-0.11
Overall perception	3.9 (0.54)	3.6 (0.30)	2.97	.006	0.36

Professional experience and perceptions of service quality

To examine whether years of experience influenced professionals' perceptions, regression analyses were conducted with difference scores (home – center ratings) as the dependent variables. As shown in Table 3, neither total years of practice ($B = .003$, $p = .809$) nor years of experience in EI ($B = –.006$, $p = .759$) were significant predictors.

Table 3

Linear regression predicting differences in perceived service quality (home – center) from years of professional experience

Predictor	*B*	*SE B*	*β*	*t*	*p*	R^2
Total years of practice	0.003	0.011	0.03	0.24	.809	.001
Years of experience in early intervention	–0.006	0.020	–0.04	–0.31	.759	.001

Education level and perceptions of service quality

To examine whether education level influenced professionals' perceptions, regression analyses were conducted with difference scores (home – center ratings) as the dependent variable. As shown in Table 4, education level (university degree vs. postgraduate specialization in EI) was not a significant predictor ($B = 0.034$, $p = .880$).

Table 4

Linear regression predicting differences in service quality (home – center) from education level

Predictor	*B*	*SE B*	*β*	*t*	*p*	R^2
Education (0 = University degree, 1 = Postgraduate specialization)	0.034	0.224	0.02	0.15	.880	.000

Frequency of service provision and perceptions of service quality

To examine whether the frequency of home- and center-based service provision influenced professionals' perceptions, regression analyses were conducted with difference scores (home – center ratings) as the dependent variable (Table 5). Results indicated that frequency of home-based provision was a significant predictor of perceived differences, with more frequent provision associated with stronger preferences for home-based services ($B = 0.154$, $SE = 0.072$, $t(65) = 2.12$, $p = .037$, $R^2 = .062$). By contrast, frequency of center-based provision was not a significant predictor ($B = 0.099$, $p = .483$).

Table 5

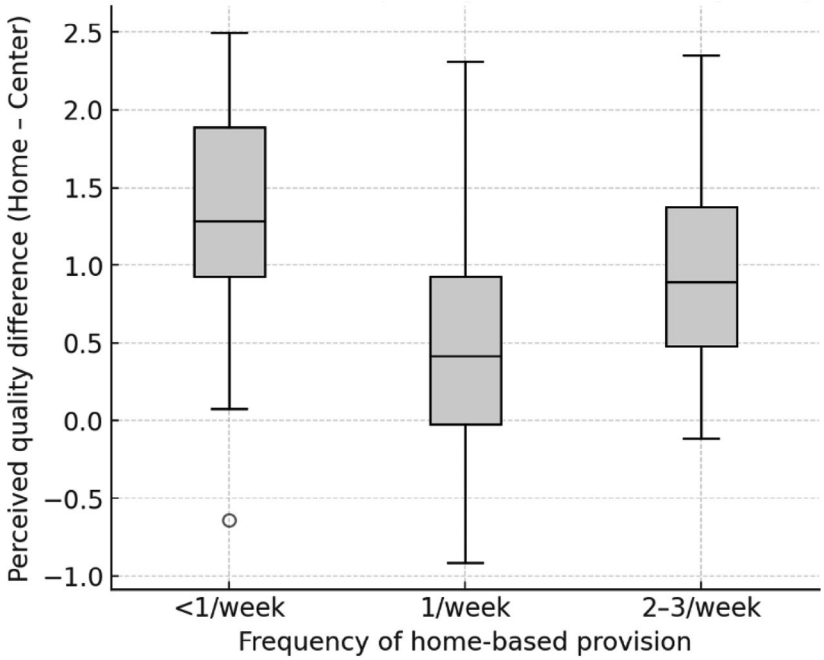
Linear regression predicting differences in perceived service quality (home – center) from frequency of service provision

Predictor	*B*	*SE B*	*B*	*T*	*P*	R^2
Home-based frequency	0.154	0.072	0.25	2.12	.037	.062
Center-based frequency	0.099	0.140	0.08	0.71	.483	.008

As shown in Figure 1, professionals who provided home-based services 2–3 times per week reported the largest mean differences in favor of home-based models (M = 1.06, SD = 0.68), compared to those who provided services once per week ($M = 0.71$, $SD = 0.82$). Those providing services less than once per week also reported relatively large differences ($M = 1.02$, $SD = 0.65$). While frequency of provision was thus a significant predictor of perceptions, the explained variance was modest ($R^2 = .062$).

Figure 1

Perceived quality difference by frequency of home-based provision



Boxplot illustrating differences in perceived service quality (home – center ratings) by frequency of home-based provision (<1/week, 1/week, 2–3/ week). Higher values indicate stronger preferences for home-based services.

Discussion

This study examined how professionals in Croatia perceive the quality of EI services delivered in home- and center-based settings. The findings revealed that overall quality was rated significantly higher in the home setting, with particularly pronounced advantages in domains of child and family engagement, collaboration with families and other professionals, and parental competences. By contrast, no significant differences were observed for service characteristics, professional support, professional competences, or general satisfaction. The frequency with which professionals provided home-based services emerged as a significant predictor of their perceptions, while neither years of professional practice nor completion of postgraduate specialization in EI influenced perceived differences.

The higher ratings for home-based services align with emerging international evidence emphasizing the advantages of delivering EI within children's natural environments. Current findings suggest that when

intervention is embedded in family routines and home contexts, parents not only engage more actively, but their participation also improves learning outcomes and generalization. For example, Montaño-Merchán et al. (2025) report that family-centred, routine-based models implemented in Spain reinforce parental empowerment, shared decision-making, and functional learning. Similarly, Guo (2024) found that home-based parental involvement is positively associated with children's language competencies, while Barnett (2020) demonstrated that greater parental engagement at home enhances school readiness. These contemporary findings bolster earlier studies (Carter et al., 2011; Roggman et al., 2009; Swanson et al., 2011) and reinforce the interpretive value of our data, which indicate that professionals perceive greater parental competence and collaboration in home contexts.

At the same time, the absence of significant differences in domains such as professional competences and general satisfaction underscores the centrality of professional expertise and program quality regardless of location. Dunst (2017) and Moore (2012) argued that intervention outcomes are shaped not only by setting but also by the competencies and attitudes of practitioners. In the Croatian context, this aligns with findings by Šarčević Ivić-Hofman et al. (2024), who show that professionals' self-assessed knowledge about working with children with developmental disabilities strongly predicts their job satisfaction and perceived quality of support.

Contrary to expectations, neither years of practice nor postgraduate specialization predicted differences in perceptions. This finding suggests that perceptions of service quality may be less a function of seniority or formal qualifications and more strongly shaped by situational and relational aspects of service delivery. One possible explanation is that Croatian professionals, regardless of experience, are exposed to similar systemic constraints—such as limited staffing, variable regional availability, and weekly service schedules—that shape their perceptions in comparable ways (Matijaš et al., 2019; UNICEF, 2020). The relatively small number of professionals with postgraduate specialization in EI may also have limited the ability to detect differences, but the null findings nonetheless highlight the importance of contextual rather than individual determinants.

To date, no studies in Croatia have directly examined how professionals perceive the quality of EI depending on whether services are delivered at home or in centers. This represents a notable gap, given that the Croatian system of early developmental support has been characterized by shortages of trained staff, marked regional inequalities, and the predominance of relatively infrequent (often weekly or less) home visits (Matijaš et al., 2019; UNICEF, 2020). The present findings, therefore, provide novel evidence that professionals' perceptions are shaped as much by these systemic barriers as by their individual experience or training. These findings are also consistent with

international evidence indicating that barriers perceived by professionals, such as limited resources, lack of time, and institutional constraints, are among the key challenges to implementing family-centered EI services (Pacheco-Molero et al., 2025).

Frequency of service provision was significantly associated with perceptions: professionals who delivered home-based services more frequently reported stronger differences in favor of the home model. This suggests that repeated exposure to home-based practice may reinforce recognition of its advantages, allowing professionals to observe how embedding interventions in everyday routines supports parent–child interaction and developmental progress. At the same time, the modest effect size ($R^2 = .062$) indicates that frequency explains only part of the variance, underlining the role of broader systemic and contextual influences.

Several additional factors may have contributed to professionals' more favorable perceptions of home-based EI. First, increased motivation and professional satisfaction associated with working in natural environments may influence perceptions of quality, particularly among professionals who value family-centered practice. Second, a novelty effect cannot be ruled out, as home-based services are still less frequent in Croatia and may therefore be perceived as more meaningful or professionally rewarding.

Furthermore, group and organizational dynamics within institutions may shape shared professional norms and expectations, potentially influencing how different service models are evaluated. Finally, socially desirable responding and self-report bias may have contributed to more positive ratings of domains closely aligned with contemporary professional values, such as collaboration with families and parental empowerment.

These findings must also be considered within the broader Croatian service context. Since its formal introduction into the social welfare system in 2011, EI in Croatia has been characterized by regional variability, insufficient multidisciplinary coordination, and resource limitations. Families often face long waiting times and limited intensity of services, while professionals must balance heavy caseloads and travel demands (UNICEF, 2020). In this context, home-based provision may be viewed by professionals as a particularly valuable mode of service delivery, as it reduces burdens on families, fosters naturalistic learning, and supports collaborative partnerships, even when systemic constraints limit the overall availability of services.

Practical implications for policy and practice

The findings carry important implications for strengthening EI services in Croatia. First, investment in supporting more regular home visits is crucial, given the strong association between frequency of provision and perceptions of quality. This may be facilitated through improved organization of mobile

teams, workload planning, and service scheduling, enabling families to receive more consistent support within their natural environments.

Second, the absence of differences by professional experience or education level points to the importance of systemic rather than individual determinants of service quality. Training and supervision programs that focus on coaching, collaboration with parents, and embedding intervention strategies in daily family routines could strengthen practice across the workforce (Barton & Fettig, 2013; Spittle & Treyvaud, 2016).

Finally, while home-based services offer unique opportunities for parent empowerment and child engagement, center-based provision also remains an essential component of EI systems. Center-based settings facilitate multidisciplinary assessments, access to specialized equipment, and structured therapeutic conditions, which are particularly valuable for children with more complex developmental needs. A balanced and flexible service model that leverages the strengths of both approaches is most likely to meet the diverse needs of children and families (Bruder, 2010).

From a policy perspective, these findings are directly relevant to the ongoing development of EI services in Croatia. National strategic documents and analyses have repeatedly emphasized the need to strengthen family-centered, accessible, and equitable EI services, while addressing regional disparities and limited service intensity (UNICEF, 2020; Vočanec et al., 2018). The present results provide empirical support for these policy priorities, highlighting professionals' recognition of the added value of home-based provision and the importance of increasing service frequency within the existing EI system.

Limitations and future directions

The reliance on self-report measures represents an important limitation of this study and may have introduced social desirability and self-presentation biases. Professionals may have rated service quality more positively due to their dual role as both evaluators and providers of EI services, particularly in domains related to parental competences and collaboration (Podsakoff et al., 2003). Consequently, perceptions of higher quality in home-based services should be interpreted with caution.

The cross-sectional design further limits causal inference. In addition, the relatively small number of professionals with postgraduate specialization in EI reduced statistical power for detecting differences related to education level.

Moreover, as special education teachers constituted the majority of the sample, the findings primarily reflect their professional perspectives, which may limit the generalizability to other EI professionals, such as speech and language therapists, psychologists, or physiotherapists. Regional variability in service availability, staffing, and organizational models may also have influenced professionals' perceptions of service quality. Systemic constraints,

including limited resources, travel demands, and infrequent service schedules, may therefore shape perceptions independently of actual service effectiveness, further limiting the generalizability across different regional contexts.

Future research should integrate observational measures of service fidelity, examine associations between professional perceptions and child or family outcomes, and employ mixed-methods designs to capture how professionals interpret and negotiate the challenges of delivering EI in different contexts.

Conclusion

This study showed that professionals in Croatia perceive the quality of EI services more positively when delivered in the home, particularly in terms of child and family engagement, collaboration with families, and parental competences. These findings highlight the added value of family-centered, natural-environment practices. At the same time, the influence of education and professional experience was negligible, while the frequency of service provision modestly shaped professionals' perceptions.

From a practical perspective, the results underscore the need to expand opportunities for regular home-based support. For policy, this highlights the importance of reducing regional variability and ensuring sustainable workforce development in family-centered practices. Taken together, the findings point to the need for a more equitable and balanced EI system in Croatia, one that integrates both home- and center-based services to ensure that all children and families can access appropriate, high-quality support.

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Perspektiva stručnjaka o ranoj intervenciji u Hrvatskoj: Uporedni kvalitet usluge u domu porodice i u ustanovi

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Uvod: Usluga rane intervencije ima ključnu ulogu u podršci deci sa razvojnim rizicima i njihovim porodicama. U Hrvatskoj se RI može pružati u porodičnom domu ili u specijalizovanim ustanovama, ali malo se zna o tome kako stručnjaci procenjuju kvalitet ovih modela usluga. *Cilj*: Cilj istraživanja bio je da se ispitaju percepcije stručnjaka o kvalitetu usluge rane intervencije, uz poređenje modela koji se realizuju u domu porodice ili u ustanovi, kao i da se utvrdi da li se te percepcije razlikuju u odnosu na profesionalno iskustvo, obrazovanje i učestalost pružanja usluga. *Metode*: U istraživanju je učestvovalo 67 stručnjaka iz različitih delova Hrvatske (91% žena; medijana starosti = 32 godine). Medijana profesionalnog iskustva bila je 13 godina, od čega šest u oblasti rane intervencije. Percepcije su procenjivane pomoću adaptirane hrvatske verzije *Inventara kvalitete centara za ranu intervenciju*. Razlike između modela analizirane su pomoću *t*-testa za zavisne uzorke, a regresionim analizama ispitani su prediktori razlika. *Rezultati*: Ukupne ocene kvaliteta bile su značajno više za uslugu u domu porodice (M = 3.9, SD = 0.54) nego za uslugu u ustanovi (M = 3.6, SD = 0.30; p = .006, Cohen's *dz*

= 0.36). Najveće razlike u korist modela u domu odnosile su se na uključivanje deteta i porodice, saradnju sa roditeljima i roditeljske kompetencije (sve $p < .001$). Iskustvo i postdiplomska specijalizacija nisu bili značajni prediktori, dok je učestalost rada u domu bila značajna ($B = 0.154$, $p = .037$). *Zaključak*: Stručnjaci su kvalitet rane intervencije procenjivali višim kada se usluge pružaju u domu porodice, naročito u oblastima saradnje i angažovanja porodice. Češće iskustvo u radu u porodičnom okruženju doprinosi boljem prepoznavanju prednosti ovog pristupa, što ukazuje na potrebu za širenjem porodično orijentisanih, kućno zasnovanih usluga rane intervencije u Hrvatskoj.

Ključne reči: rana intervencija, percepcije stručnjaka, kvalitet usluge, porodično usmeren pristup

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Verbal fluency performance across different neurological disorders: a preliminary investigation

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Introduction. Language disorders can arise as a consequence of various neurological conditions, affecting communication and cognitive functioning. *Aim.* The aim of this study was to compare verbal fluency in individuals with different neurological disorders. *Method.* The sample consisted of 45 participants divided into three clinical groups according to the etiology: 15 post-stroke patients, 15 individuals with traumatic brain injury, and 15 patients with multiple sclerosis. The control group comprised 16 neurologically healthy participants. Phonemic and semantic verbal fluency tasks were administered. *Results.* Results indicated statistically significant differences in both phonemic and semantic fluency between each clinical group and the control group. Stroke patients demonstrated significantly lower performance on both phonemic and semantic fluency tasks compared to those with traumatic brain injury and multiple sclerosis. *Conclusion.* All three clinical groups with neurological disorders showed reduced verbal fluency abilities compared to healthy controls. These findings suggest that verbal fluency is frequently impaired across neurological disorders of different etiologies, regardless of clinical presentation.

Keywords: verbal fluency, stroke, traumatic brain injury, multiple sclerosis

Introduction

Language disorders may arise from various neurological diseases or injuries, particularly when brain regions critical for language processing are affected (Kristensson et al., 2024). In most individuals, the left hemisphere is

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dominant for language, and lesions in this hemisphere frequently lead to deficits across multiple language domains (Vuković, 2010, 2024).

Left-hemisphere lesions frequently cause aphasia, which is characterized by impairments in language production, comprehension, and the functional use of language. The specific presentation and severity of deficits depend on the lesion's location. For example, lesions in the frontal cortex, including the supplementary motor speech area, typically result in non-fluent aphasia, such as Broca's aphasia or transcortical motor aphasia (Vuković, 2024). In contrast, damage to the posterior part of the superior temporal gyrus may lead to a severe comprehension deficit, characteristic of Wernicke's aphasia (Sul et al., 2019; Vuković, 2010, 2024).

Verbal fluency refers to the ability to retrieve words based on phonemic or semantic cues and relies on both language functioning and broader cognitive processes (Kristensson et al., 2024). With regard to the underlying cognitive mechanism, it is generally hypothesized that phonemic fluency is primarily linked to executive abilities, whereas semantic fluency depends on the integrity of semantic memory (Rosser & Hodges, 1994). Performance on verbal fluency tasks also depends on verbal output capacity and processing speed (Godefroy et al., 2024).

Neuroimaging studies indicate that distinct cortical regions contribute to verbal fluency performance. The pars triangularis is primarily implicated in phonemic fluency, whereas semantic fluency engages the anterior temporal pole, corresponding to Brodmann's area 38 (Godefroy et al., 2023).

Deficits in verbal fluency have been documented in multiple neurological populations, including stroke patients, individuals with TBI, and those with neurodegenerative disorders (Vuković, 2024; Vuković, 2019a, 2019b). Reduced performance on verbal fluency tasks is closely associated with broader language impairments (Vuković & Chen, 2025).

Stroke patients may develop aphasia in 30 – 40% of cases following a cerebrovascular incident in the dominant hemisphere (Vuković et al., 2025). In milder forms of aphasia, patients often exhibit word-finding difficulties or object-naming deficits that do not conform to classical aphasic syndromes (Vuković, 2010). Language deficits in TBI similarly frequently manifest as word-finding difficulties, often associated with executive dysfunction resulting from diffuse axonal injury affecting both hemispheres (Chabok et al., 2012; Vuković, 2019a). In multiple sclerosis, language deficits have been reported, particularly in word retrieval during object-naming and verbal fluency tasks (Vuković, 2019b).

The aim of this study was to assess the phonemic and the semantic fluency in three clinical populations (stroke patients, individuals with TBI, and those with multiple sclerosis) and to compare their performance with that of healthy controls. We hypothesized that all clinical groups would demonstrate

lower verbal fluency than controls, and that differences in performance might also emerge among the clinical groups.

Methods

Sample

The study included 45 participants with neurological disorders: 15 post-stroke patients, 15 patients with traumatic brain injury (TBI), and 15 patients with multiple sclerosis (MS). The control group consisted of 16 neurologically healthy participants without hearing impairments or speech-language disorders. Demographic data of the participants are presented in Table 1.

The sample was formed using a non-random, convenience sampling method, with the participants providing informed consent. The clinical groups were recruited from the Rehabilitation Clinic "Dr. Miroslav Zotović". Inclusion criteria for clinical groups were: 1. stroke confirmed to the left hemisphere, TBI with diffuse axonal injury, or MS; 2. brain lesion confirmed by computed tomography (CT) or magnetic resonance imaging (MRI); 3. motivation to participate in the study.

Inclusion criteria for the control group were: absence of neurological, psychiatric, or speech-language disorders.

The mother tongue of all participants was Serbian. Written informed consent was obtained from all participants, and the study was approved by the Ethics Committee of the Clinic (decision number: 03-788/1).

Table 1

Demographic data of participants

Groups	Age (M/SD)	Years of education (mean)	Gender
Stroke patients	64.73 (13.41)	12.27	Male 53.33% (n = 8) Female 46.67% (n = 7)
Patients with MS	53.53 (14.45)	12.87	Male 46.67% (n = 7) Female 53.33% (n = 8)
Patients with TBI	49.07 (16.76)	12.00	Male 80% (n = 12) Female 20% (n = 3)
Control group	63.31(13.21)	12.81	Male 50% (n = 8) Female 50% (n = 8)

M – mean; SD – standard deviation

Results of the *t*-test indicated significant differences in mean age between stroke and TBI patients (p = .001), stroke and MS patients (p = .032), healthy controls and the TBI group (p = .008), and healthy controls and the MS group (p = .050). The *t*-test also showed that there were no significant differences in years of education across the examined groups.

The Chi-square test did not indicate significant gender differences between the tested groups (p = .114).

Procedure and Instruments

Information regarding the type of neurological disorder and brain lesions was obtained from patients' medical records. The stroke group included patients with ischemic strokes, all with CT or MRI-confirmed lesions in the cortex of the left hemisphere. Participants with right-hemispheric lesions were excluded. The TBI group included patients with MRI-confirmed diffuse axonal injury. The MS group included patients with MRI-confirmed chronic demyelinating changes in the basal ganglia or diffuse white matter lesions.

In all three groups of participants, the Serbian Aphasia Screening test (Vuković, 2010; Vuković et al., 2024) was used to exclude more severe forms of aphasia, while the Mini Mental State Examination – MMSE (Vuković, 2019b) was used to exclude patients with cognitive deficits.

The assessment

Verbal fluency was assessed using the *phonemic* and *semantic verbal fluency tests* (Benton & Hamsher, 1976; Spreen & Strauss, 1991). In the phonemic fluency task, participants were instructed to generate as many words as possible beginning with letters "K", "M", and "S" within a one-minute time frame per letter. Proper nouns, geographic terms, and numbers were excluded. In the semantic fluency task, participants were asked to generate as many animals as they could within one minute (Vuković, 2024). All clinical participants were tested at the Rehabilitation Clinic „Dr Miroslav Zotović ", while control participants were recruited conveniently from the examiner's immediate vicinity.

Statistical processing

Statistical analysis was conducted using IBM SPSS Statistics for Windows, version 26.0.

Descriptive statistics included frequency, percentage, median, arithmetic mean, standard deviation, minimum, maximum, and interquartile range. Group differences were evaluated using the Kruskal-Wallis test for multiple group comparison, with post-hoc analyses conducted using the Mann - Whitney test and two-factor ANOVA where appropriate.

Results

The results of the Serbian Aphasia Screening Test (SAST) showed that participants with stroke achieved an average score of 44.25 points (SD = 1.45) with reduced performance observed on the naming, repetition, reading, and writing tasks. Participants with TBI had an average score of 47.67 (SD =

1.70), while the average score in patients with MS was 47.85 (SD = 1.06). Both groups demonstrated reduced performance on the naming tasks. A statistically significant difference in the total SAST score was found between the stroke group and the other two clinical groups (p = .000).

The results of the MMSE showed that stroke patients had a total score of 27.20 points (SD = 1.15), TBI patients 28.40 (SD = 1.06), and MS patients 27.73 points (SD = 1.49). The differences in scores were not statistically significant (p = .270).

Performance on the verbal fluency tests

The results are presented first for each group individually, followed by the between-group comparison. Firstly, phonemic fluency was analyzed separately for each phoneme (K, M, S) and for the total score (Table 2). Secondly, semantic fluency performance was measured (Table 3).

Phonemic fluency

Table 2

Number of words produced on the phonemic verbal fluency test

Phonemes	Groups	M	SD	Min	Max	Mdn	IQR
K	Stroke	4.20	3.05	0	9	5.00	5.00
	MS	5.20	3.76	2	15	4.00	4.00
	TBI	5.73	3.35	2	15	5.00	3.00
	Control group	11.75	3.51	5	16	12.50	5.75
M	Stroke	3.20	2.34	0	7	3.00	4.00
	MS	4.00	2.48	1	10	4.00	3.00
	TBI	4.00	1.69	2	7	4.00	3.00
	Control group	9.13	4.33	2	16	9.00	7.00
S	Stroke	5.13	4.36	0	17	4.00	4.00
	MS	5.80	3.28	2	12	6.00	6.00
	TBI	4.60	1.88	1	8	4.00	2.00
	Control group	10.69	4.66	2	19	10.50	4.75
Total score	Stroke	12.53	8.58	0	30	13.00	10.00
	MS	15.00	8.82	5	37	13.00	11.00
	TBI	14.33	5.74	7	27	13.00	8.00
	Control group	31.56	11.68	9	51	32.50	15.25

M – mean, SD – standard deviation, Min – minimum, Max – maximum, Mdn – median, IQR – interquartile range

The Kruskal-Wallis test indicated statistically significant differences among the groups on the phonemic fluency test (H = 21.15, df = 3, p = .000).

Post-hoc comparison using the Mann-Whitney test revealed that:

- Stroke patients produced significantly fewer words than controls for all phonemes: K ($U = 16.00$, $p < .001$), M ($U = 30.00$, $p < .001$), S ($U = 42.00$, $p < .01$), and in the total score ($U = 25.00$, $p < .01$).
- MS patients scored significantly lower than controls for all phonemes: K ($U = 24.50$, $p < .001$), M ($U = 38.50$, $p = .001$), S ($U = 47.00$, $p < .01$), and in the total score ($U = 31.50$, $p < .001$).
- TBI patients also performed significantly worse than controls for all phonemes: K ($U = 28.50$, $p < .001$), M ($U = 40.00$, $p = .001$), S ($U = 27.00$, $p < .001$), and in the total score ($U = 25.50$, $p < .001$).

Semantic fluency

Table 3

Number of words produced on the semantic fluency test

Semantic fluency	Groups	M	SD	Min	Max	Mdn	IQR
Animals	Stroke	9.20	5.76	0	19	9.00	10.00
	MS	10.93	3.99	5	19	10.00	3.00
	TBI	10.07	4.74	4	20	10.00	9.00
	Control group	17.13	6.06	7	29	17.00	8.00

M – mean, SD – standard deviation, Min – minimum, Max – maximum, Mdn – median, IQR – interquartile range

The Kruskal-Wallis test showed statistically significant differences among the groups in the semantic fluency test ($H = 14.92$, $df = 3$, $p < .01$).

Mann-Whitney post-hoc analyses indicated that the control group produced significantly more words than stroke patients ($U = 42.50$, $p < .01$), MS patients ($U = 48.00$, $p < .01$), and TBI patients ($U = 39.50$, $p = .001$).

Discussion

This study examined verbal fluency in patients with three groups of neurological disorders: stroke, traumatic brain injury (TBI), and multiple sclerosis (MS), with the aim of establishing their performance on phonemic and semantic fluency tasks in comparison to a control group of neurologically healthy individuals.

The results indicate that stroke patients scored significantly lower than healthy controls on both phonemic and semantic verbal fluency tasks. Specifically, stroke patients produced approximately three times fewer words on the phonemic verbal fluency task and nearly twice as few words on the semantic fluency task compared to the control group. These findings suggest that phonemic fluency represents a more challenging task than semantic fluency. Similar patterns have been reported by Vuković and Stanković (2023), who

observed that older neurologically healthy adults performed worse on phonemic than on semantic fluency tasks.

Given that the stroke patients exhibited a mild form of aphasia, these results indicate that phonemic fluency is a particularly sensitive measure for detecting language deficits in this neurological group. Similar findings have been reported by other researchers, who observed impaired performance on phonemic fluency tasks in post-stroke individuals (Leggio et al., 2000; Babulal, 2016).

Participants with TBI demonstrated significantly lower verbal fluency scores compared to healthy controls, producing nearly half as many words on the phonemic task. Semantic fluency was similarly impaired. While some studies have reported no significant differences between TBI and neurotypical subjects (Wauters, Marquardt & Muñoz, 2019), other researchers indicate that moderate to severe TBI is associated with markedly impaired verbal fluency, particularly on phonemic fluency tasks (Cralidis & Lundgren, 2014; Mehri et al., 2017).

Participants with MS also demonstrated reduced verbal fluency compared to healthy controls, with significantly lower mean scores on both phonemic and semantic tasks. These results are consistent with previous studies reporting verbal fluency deficits in the MS population (Barois et al., 2021; Henry & Beatty, 2006). Barois et al. (2021) additionally observed delayed imitation, slower revival before task switching, and longer inter-word latencies in MS participants.

In our study, MS participants produced an average of 15 words on the phonemic fluency task and 10.93 words on the semantic task. These findings differ from those of Ebrahimipour et al. (2008), who reported lower phonemic fluency (5.88 words) but higher semantic fluency (15.03 words) in MS participants compared to controls. Some researchers have suggested that reduced verbal fluency in MS may be attributed to language impairments, slower cognitive processing, and executive dysfunction (Viterbo et al., 2013; Pitteri et al., 2023; Vuković, 2019b).

Across the clinical groups, stroke participants exhibited the lowest mean verbal fluency scores relative to those with TBI and MS. Interestingly, participants with TBI and MS produced similar numbers of words across tasks.

Previous research has reported significantly lower semantic verbal fluency performance in stroke patients compared to individuals with language disorders following TBI (Kristensson et al., 2024; Vuković et al., 2008). Based on their findings, Vuković et al. (2008) proposed that semantic fluency tasks may serve as a differential diagnostic tool to distinguish post-stroke aphasia from language deficits resulting from TBI. Since our study included patients with mild forms of post-stroke aphasia, we consider that semantic verbal fluency alone cannot reliably differentiate mild aphasia from posttraumatic language deficits. However, increasing the number of patients with mild post-stroke

aphasia and mild posttraumatic language deficits may provide more precise information regarding the significance of verbal fluency tests in differential diagnosis.

Limitations

This study included a relatively small number of participants within each clinical group, and precise lesion location data were not available.

Future research could aim to include larger samples and explore the relationships between verbal fluency, semantic memory, executive functions, and broader language abilities in post-stroke, TBI, and MS populations.

Conclusion

Verbal fluency is significantly impaired in patients with stroke, TBI, and those with multiple sclerosis. All three neurological groups achieved significantly lower scores on phonemic and semantic verbal fluency tasks compared to a neurologically healthy control group. Stroke participants exhibited lower verbal fluency performance than participants with TBI and MS. Considering that only stroke patients had mild forms of aphasia, we suggest that their reduced performance on verbal fluency tests is primarily linked to language impairments.

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Verbalna fluentnost kod različitih neuroloških poremećaja: preliminarno istraživanje

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Uvod: Jezički poremećaji mogu nastati kao posledica različitih neuroloških stanja, utičući na komunikaciju i kognitivne funkcije. *Cilj:* Cilj ove studije bio je utvrđivanje sposobnosti generisanja reči na zadacima verbalne fluentnosti kod osoba sa različitim neurološkim oštećenjima. *Metode*: Uzorak se sastojao od 45 ispitanika, koji su prema etiologiji neurološkog poremećaja podeljeni u tri kliničke grupe: 15 pacijenata koji su doživeli moždani udar, 15 ispitanika sa traumatskom povredom mozga i 15 pacijenata sa multiplom sklerozom. Kontrolnu grupu činilo je 16 neurološki zdravih ispitanika. U istraživanju su primenjeni testovi fonemske i semantičke verbalne fluentnosti. *Rezultati:* Rezultati su pokazali statistički značajne razlike u fonemskoj i semantičkoj fluentnosti između sve tri kliničke grupe i kontrolne grupe. Dalja analiza rezultata pokazala je da su pacijenti sa moždanim udarom postigli statistički značajno niže skorove na zadacima fonemske i semantičke fluentnosti u poređenju sa ispitanicima sa traumatskom povredom mozga i multiplom sklerozom. *Zaključak*: Sve tri grupe ispitanika sa neurološkim poremećajima ispoljile su sniženu sposobnost verbalne fluentnosti u poređenju sa kontrolnom grupom zdravih ispitanika. Ovi rezultati ukazuju na to da je verbalna fluentnost često oštećena kod neuroloških poremećaja različite etiologije, nezavisno od njihove kliničke slike.

Ključne reči: verbalna fluentnost, moždani udar, traumatska povreda mozga, multipla skleroza

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