

Hungarian High School Students' Opinions on Ideal Teacher Interaction

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ABSTRACT

Since the 2000s, there has been an increasing focus on the development and emergence of tools that students can use to evaluate their teacher's performance. One of these tools is the Questionnaire on Teacher Interaction (QTI) developed by Wubbels et al. (1987), which is based on Leary's (1957) functional theory and methodology for personality evaluation. The QTI makes the description of the teacher's activity possible from the perspective of student assessment. Wubbels et al. (1987) provided eight personality variables of interpersonal behavior. In the current research, the 48-item-long Hungarian language version of the QTI questionnaire developed by Wubbels et al. (1987), revised by Tóth & Horváth (2022) was applied. The questionnaire was utilized to collect data from students on the ideal teacher interaction. The research involved 326 Hungarian high school students, and the reliability of the QTI ranged between 0.731 and 0.892. The research results show that ideal teacher interactions are characterized by low levels of dissatisfied, uncertain, scolding, and warning attitudes, while high-level teacher interaction was assumed as controlling, helpful, friendly, understanding, and consensus-seeking attitudes. It could be concluded that the highest variance was observed in the dimensions of strictness and forcefulness.

Index Terms—teacher behavior, interpersonal relations, teacher attitudes, student teacher relationship, classroom environment

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I. INTRODUCTION

The current research is based on the results of a previous study (Szabó, 2023). The study published in 2023 aimed to answer the question whether the methodology of teaching History in schools can change. The results revealed that teachers play a significant role in their students' career orientation, since many students choose the teaching profession because of their teachers as role models. This previous re-search was conducted among students majoring in history teaching at J. Selye University (UJS) in Slovakia. The total number of students majoring in teaching History in 5th grade (second year of Master degree studies) was 89. The question-naire survey was completed by 83 students (44 male and 39 female respondents). In the case of 58% of the analyzed sam-ple, specific teacher of History had an impact on the stu-dents' decision to choose history teaching as their major at university. Since the influence of teachers on students has been studied and proven (Johnston, Wildy & Shand, 2021), we wanted to examine the interaction between teachers and students in the classroom. The effectiveness of teaching and educational work depends largely on the teacher's activities, especially on their interpersonal behavior, interaction skills, and proficiency (Berliner & Calfee, 1996; Brekelmans et al., 2002; den Broek et al., 2004; Tóth & Horváth, 2022). Based on these previous studies, we aimed to investigate the ideal teacher interaction style from the perspective of high school students in Hungary.

1.1 THEORETICAL FRAMEWORKS

Since the 2000s, there has been an increasing focus on the development and emergence of tools that allow students to evaluate their teachers (Goh & Fraser, 1998; Koul & Fisher, 2005; Wubbels et al., 2006; Passini et

al., 2015). Classroom interaction can be interpreted as two-way interpersonal communication that triggers cognitive and/or emotional effects and influences the behavior and actions of the parties involved (Amidon & Hough, 1967; Dunkin & Biddle, 1974; Mehan, 1979). Regarding classroom communication, three trends can be identified (Tóth & Horváth, 2022). The first is the behaviorist approach, which focuses on categorizing speech events and determining their frequency. This is evident in the coding of social interaction functions and the analysis of classroom interactions (Erickson, 2006; Flanders, 1977). The second is the intuitive and qualitative approach, an interpretative approach that relies on sociological and ethnographic research. The sociological approach examines specific speech-behavior patterns and come to the conclusion that teacher–student interactions and the teacher’s relationship with the class are essential for optimal teacher performance (Jordan & Henderson, 1995; Erickson, 2006). In contrast, research applying the ethnographic approach focuses on the quantitative analysis of conversations in the classroom (Greeno, 2006; Jordan & Henderson, 1995), emphasizing the primacy of learning as a social system (Erickson, 2006). The third approach is based on personality theories, where the focus of observation is not limited to a specific class but encompasses behavioral manifestations as well as character and personality traits capable of expressing a teacher’s interaction in pedagogical situations. Among these theories, the model of teacher interpersonal behavior (IPC-T) developed by Wubbels et al. (1985) stands out. This model adapts the Leary circumplex model (Leary, 1957) to the educational context (Leary & Harvey, 1956; Tóth & Horváth, 2022).

The Leary’s sociometer theory is based on Karen Horney and Harry Stack Sullivan’s interpersonal theories. Leary synthesized a system from Horney and Sullivan’s theories, then developed a research procedure for it. The Leary personality model depicts 16 interpersonal behavior variables along two dimensions in a circular continuum that is why it is often referred to as the Rose of Leary, where each behavior type can be interpreted in 8 categories (Figure 1).

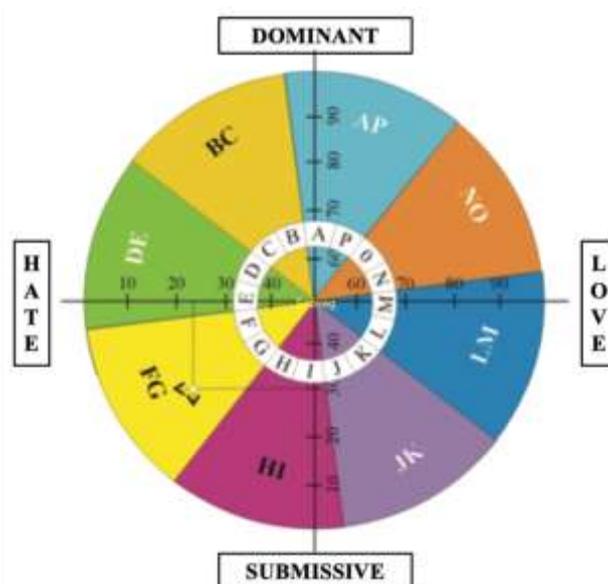


Figure 1: The 16 interpersonal behavioral variables of the Leary personality model

Source: Tóth & Horváth, 2022, 60

The vertical axis is determined by the A – I behavioral variables, while the horizontal axis is determined by the E – M ones. The Leary interpersonal circumplex model consists of 8 categories, forming an octant as follows: AP: managerial – autocratic, BC: competitive – narcissistic, DE: aggressive – sadistic, FG: rebellious – distrustful, HI: self-effacing – masochistic, JK: docile – dependent, LM: cooperative – over-conventional, NO: responsible – hypernormal. Leary developed diagnostic procedures for this theory, where scores are assigned to each octant, taking into account the intensity indices (Leary, 1957). The adaptation of Leary’s circumplex model (IPC, Leary, 1957) to the educational context, along with Watzlawick’s systems-oriented communication model (1967), led to the creation of the Model for Interactional Teacher Behaviour (MITB) by Wubbels et al. (1985).

Wubbels et al. (1987) applied the general model of interpersonal communication used by Leary (1957) as a starting point for his work, enabling the description of teachers’ activities based on how they are perceived by their students (Tóth & Horváth, 2022). Wubbels et al. (1987) also provided the 8 personality variables of interpersonal behavior (Table 1).

# major categories of behavior defined by Leary	# major categories of behavior defined by Wubbels	Characteristics of categories (These kinds of teachers...)
AP: managerial – autocratic	LEA: leadership	notice what is happening; lead, organize, give orders; set tasks, propose solutions, explain, arouse students' interest
NO: reasonable – hypernormal	HFr: helping – friendly	assist, show interest in students' problems, involved, behave friendly and politely, sense of humor
UM: cooperative – over-conventional	UND: understanding	listen with interest, empathic behavior, show confidence and understanding, initiate conflict resolution, patient, open
IK: docile – dependent	SRE: student responsibility / freedom	provides opportunity for independent work; wait for class to let off steam; give freedom and responsibility; take the proposals of the students into consideration
HI: self-effacing – masochistic	UNC: uncertain	no intervention in happenings, stay in background, apologize, wait and see how the wind blow, admit one is in the wrong
FG: rebellious – distrustful	DIS: dissatisfied	wait for silence, consider pros and cons, keep quiet, express dissatisfaction, eyes are angry, always ask questions, criticize
DE: aggressive – sadistic	ADM: administering	get angry, short-tempered, forbid, warn for mistakes, punish
BC: competitive – narcissistic	STR: strict	control of students, strict exams, strict evaluation, demand/achieve class goals, maintain silence, set rules and norms, exercise rules

Table 1: Characteristics of behavior categories defined by Leary and Wubbels
 Source: own editing based on Leary (1957) and Wubbels et al. (1987)

The octants of the teacher’s interpersonal behavior can be presented along two axes, and the order of the octants is not random. Opposite sectors represent contrasting personality traits, while sectors closer to each other are similar. There is no relationship between sectors that are orthogonal. It means that they are at right angles to each other when compared.

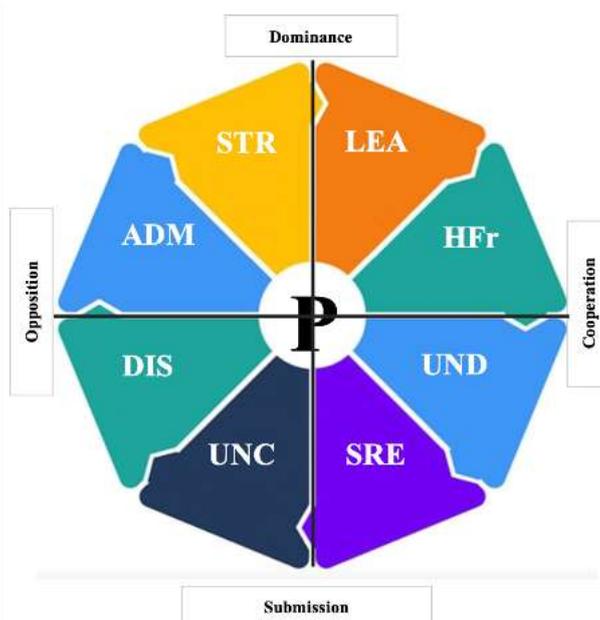


Figure 2: The model of teacher’s interpersonal behavior
 Source: own editing based on Tóth and Horváth (2022)

The teacher’s interactional behavior (Figure 2) can be interpreted along two axes. Letter "P" in the center of the figure represents the teacher’s personality. The abbreviations of personality behavior categories by Wubbels are presented in white. The vertical axis encompasses the extremes of dominance and submission, indicating the teacher’s effort to maintain their power position within the classroom or how much they delegate this role to their students. The horizontal axis encompasses the extremes of resistance and cooperation, indicating how distancing or rejecting the teacher is or how helpful and understanding they are towards their students. The eight equal sectors in the coordinate system are labeled with LEA, HFr, etc., according to their position in the coordinate system. Both the LEA and HFr sectors are characterized by dominance and cooperation. In the adjacent sectors, dominance prevails over cooperation. For example, a teacher exercising LEA behavior may explain something to the class, organize groups, and assign tasks. The neighboring HFr sector shows a more cooperative and less dominant behavior, indicating that the teacher assists students and behaves in a friendly or attentive manner (Tóth & Horváth, 2022).

Scale	Number of items in QUIT	Number of items in QTI
Leadership (LEA)	10	6
Helpful – friendly (HFR)	10	6
Understanding (UND)	10	6
Student responsibility (SRE)	9	6
Uncertain (UNC)	9	6
Dissatisfied (DIS)	11	6
Admonishing (ADM)	9	6
Strict (STR)	9	6

Table 2: The number of items in the original QTI questionnaire and the QTI questionnaire used by us

Source: own editing based on den Brok, Brekelmans & Theo, 2004 and Tóth & Horváth, 2022

In our current research, we use the Questionnaire on Teacher Interaction (QTI) developed by Wubbels et al. (1985) as well as a modified version of it in Hungarian language. The questionnaire, which served as the basis for the QTI questionnaire, is referred to as QUIT (Questionnaire for Interactional Teacher Behaviour) in the literature and originated from the ICL (Interpersonal Check List) questionnaire edited by Leary. The ICL questionnaire consisted of 77 questions and was developed for Dutch high school students (Wubbels & Brekelmans, 1998; Wubbels et al., 1991; Wubbels et al., 1985; Wubbels & Levy, 1991). The original QUIT questionnaire was developed in Dutch and included 77 items (den Brok et al., 2004) (Table 2).

The purpose of applying the original 77-item QUIT questionnaire was to assess how students perceive the teacher's in-class activities in terms of the two IPC-T dimensions as well as in relation to impact, influence, and proximity. For this purpose, a questionnaire was developed that allowed teachers to self-evaluate their interpersonal activities. This provided an opportunity to compare how the students perceive the teacher in the class and how the teachers perceive themselves. Additionally, a questionnaire was developed to measure the teacher's ideal interpersonal behavior, which is highly relevant for our current study (Tóth & Horváth, 2022). The QTI questionnaires underwent several translations and adaptations. The first English translation of the original Dutch questionnaire was applied in the United States (Wubbels & Levy, 1991; Wubbels & Levy, 1993). The translation was considered successful, as the consistency of the measurement tool was nearly the same as that of the original Dutch version (Cronbach's alpha (Dutch) = 0.61-0.90; Cronbach's alpha (American) = 0.75-0.88 (Tóth & Horváth, 2022, 100)). Subsequently, a 48-item version of the questionnaire was developed, which was first used in Australia and was also applied in our current research (Fisher et al., 1995). This questionnaire was completed by students in Australian 11th and 12th-grade Biology classes, totaling 489 students. The reliability of the 48-item version was similar to that of the original 77-item version (Cronbach's alpha (Australian) = 0.63-0.83).

1.2 THE VARIANTS OF THE 48-ITEM QTI QUESTIONNAIRE

The 48-item QTI questionnaire has been applied in various countries, including Singapore, Malaysia, Greece, and China (Fisher et al., 1995; Passini et al., 2015; Sun et al., 2018). The validity and reliability of the 48-item QTI questionnaire were confirmed by Fisher et al. (1995) through six case studies. In 2021, the Spanish version of the QTI questionnaire was used by García Bacete and Rosel Remírez (2021), who applied the questionnaire to Spanish students in the fourth and sixth grades of primary education ($n = 397$) in four Spanish urban public schools. The reliability of the Spanish 48-item questionnaire showed Cronbach's alpha (Spanish) = 0.68-0.87.

Fraser, Aldridge & Soerjaningsih (2010) discuss the adaptation of the QTI questionnaire to the Indonesian language and its adaptation to the requirements of higher education. The Slovak version is credited to Gavora, Mareš & den Brok (2003). The Czech adaptation of the QTI questionnaire was elaborated by Mareš & Gavora in 2000, and it is important to note that the measurement tool consisted of 116 items (Mareš & Gavora, 2004). The Hungarian translation of the QTI is credited to Tóth and Horváth (2022). In the translation process, a back-and-forth translation was used, and the language of the questionnaire was also checked with practicing educators. The Hungarian version of the questionnaire measuring ideal teacher interpersonal behavior can be found in their book *Tanári interakció az osztályteremben [Teacher Interaction in the Classroom]* (Tóth & Horváth, 2022, pp. 162–164). The aim of their pilot study was to create a reliable and valid Hungarian version of the questionnaire measuring ideal teacher interpersonal behavior. Additionally, they aimed to understand the perspectives of students studying at Hungarian-language higher education institutions in the Carpathian Basin regarding ideal teacher interpersonal behavior and targeted to examine these perspectives based on various background variables.

Their research took place at four universities (J. Selye University (SJE), Partium Christian University (PKE), University of Novi Sad – Faculty of Sciences (ÚE MTTK), and II. Rákóczi Ferenc College of Professional Studies (RF KMF)). The questionnaire was completed by 335 students, with an average completion time of 288.05 seconds (SD=124.360 sec; Min=60 sec; Max=1822 sec). The results of 316 respondents were evaluated, who spent at least 180 but no more than 700 seconds answering the 48-item questionnaire. The reliability of the Hungarian-language 48-item questionnaire was Cronbach's alpha (Hungarian)=0.688-0.804.

In our current research, we use the 48-item Hungarian language questionnaire elaborated by Tóth and Horváth (2022) to examine the ideal teacher interaction according to high school students.

II. MATERIALS AND METHODS

2.1 Participants

The current research sample involved 326 Hungarian students of a high school, where the students were offered to study six different professions:

- general nurse
- healthcare assistant
- child and youth supervisor
- early childhood educator and carer (ECEC)
- public service technician
- educational assistant

The major and age distributions of students are presented in Table 3:

Profession / Age	14	15	16	17	18	19	Total
general nurse	8	26	16	14	2	0	66
healthcare assistant	18	20	16	16	8	0	78
child and youth supervisor	8	4	0	0	0	0	12
ECEC	8	16	2	2	14	2	44
public service technician	6	24	2	20	38	20	110
educational assistant	8	8	0	0	0	0	16
Total	58	98	36	52	62	22	326

Table 3: Age and major distribution of students participating in the research

Source: own editing

2.2 THE PARTICIPANTS' DEMOGRAPHICAL DATA

The students' demographical data were as the follows:

- Grade: 9. 39,3%; 10. 17,8%; 11. 11,7%; 12. 23,9%; 13. 0,6%; 14. 6,7%
- Gender: female – 76%; male – 24%
- Place of residence: capital – 1,2%; city – 31,9%; small town – 64,4%; village/small settlement – 2,5%
- Future plan: would like to become a teacher – 8,6%; would not like to become a teacher – 91,4%
- Distance between residence and the high school: 0–10km – 13,5%; 11–100km – 80,4%; 202–200 km – 4,3%; 201–300 km – 1,8%
- Living in a dormitory: yes – 27%; no – 73%
- The highest education qualification of the mother: elementary school – 11,0%; technical school – 17,2%; specialized secondary school – 41,7%; grammar school – 15,3%; higher education – 14,7%
- The highest education qualification of the father: elementary school – 9,8%; technical school – 22,7%; specialized secondary school – 45,4%; grammar school – 10,4%; higher education – 11,7%.

2.3 RESEARCH QUESTIONS

The aim of the current study was to find answers for the following research questions:

Q1: What do Hungarian high school students think about the ideal teacher interaction?

Q2: Are there any significant differences between certain QTI variables in terms of the three examined background variables (age, profession, and place of residence)?

Q3: What differences or similarities can be observed in the assessment of teacher interaction when comparing the ideal teacher interaction styles perceived by teacher trainees in the Carpathian Basin with those of high school students in Hungary?

III. RESULTS

Table 4 presents the reliability values of the certain octants in terms of the entire sample and some partial ones.

Scale	Entire sample	Gender*	Profession**
Leadership (LEA)	0.741	0.734@.743	0.790@.738@.841@.684@.721@.741
Helpful – friendly (HFR)	0.892	0.800@.889	0.882@.906@.979@.788@.870@.950
Understanding (UND)	0.825	0.785@.836	0.861@.793@.750@.744@.847@.860
Student responsibility (SRE)	0.821	0.815@.823	0.813@.844@.908@.817@.815@.609
Uncertain (UNC)	0.847	0.837@.852	0.757@.870@.848@.808@.856@.939
Dissatisfied (DIS)	0.853	0.848@.855	0.880@.800@.914@.750@.874@.846
Admonishing (ADM)	0.731	0.657@.748	0.668@.787@.662@.776@.709@.750
Strict (STR)	0.814	0.802@.813	0.754@.866@.942@.849@.756@.748

Note: *male/female; **general nurse/healthcare assistant/child and youth supervisor/ECEC/public services technician/educational assistant

*male/female; **general nurse/healthcare assistant/child and youth supervisor/ECEC/public services technician/educational assistant

Table 4: The reliability values of the certain octants in terms of the entire sample and some partial ones
Source: own editing

Table 5 presents the descriptive statistical indicators of the entire sample in terms of the types of interpersonal teacher behavior.

	ADM	DIS	HFR	LEA	SRE	STR	UNC	UND
Mean	10.75	45.85	26.38	25.77	18.98	45.48	10.53	26.98
Standard deviation	4.023	4.720	4.732	3.128	4.110	4.881	4.480	3.412
95% Conf. int. low.	4.596	9.67	25.85	24.42	18.53	14.53	45.69	26.60
95% Conf. int. upper	45.615	10.71	26.90	45.622	19.43	15.60	45.98	27.35
Normal distribution	-	-	-	-	-	-	-	-

Table 5: The descriptive statistical indicators of the entire sample in terms of the types of interpersonal teacher behavior
Source: own editing

In Figure 3, we can see the mean of our sample of the QTI variables in the circumplex diagram.

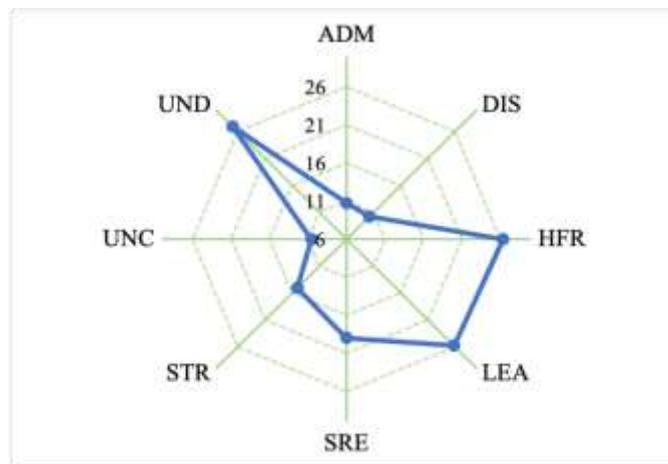


Figure 3: The QTI variables in the circumplex diagram
Source: own editing

We also examined the QTI variables in terms of the following background variables: gender, profession, place of residence, and age. Table 6 presents the averages (M) and the deviations (SD) of the sub-samples by the background variables. To compare the averages, we used the Mann–Whitney and the Kruskal–Wallis methods concerning all variables.

	ADM	DIS	HFR	LEA	SRE	STR	UNC	UND
Male M *	10.7368	10.7893	25.7895	25.5526	19.1053	11.7388	10.6579	26.7632
Male SD **	3.8346	4.9920	5.5337	3.0785	4.3805	4.9783	4.2788	3.4058
Female M.	10.7541	10.0082	26.5574	25.8361	18.8383	15.4754	10.4918	27.0492
Female SD.	4.0882	4.6269	4.4501	3.1463	4.0298	4.7889	4.5474	3.4183
general nurse M.	10.3333	10.3152	23.9091	23.9698	18.0696	13.1232	9.8485	27.0909
general nurse SD.	4.1188	5.0218	5.05578	3.1328	4.2863	4.2598	3.3569	3.7241
healthcare assistant M.	10.5405	10.1622	25.8108	25.0811	17.9865	15.9459	10.0270	26.4863
healthcare assistant SD.	3.6384	4.2168	4.9818	3.4592	4.0797	5.3681	4.5600	3.2740
child and youth supervisor M.	7.8333	10.0000	26.8333	25.8333	22.0000	11.8333	11.0000	28.3333
child and youth supervisor SD.	1.4035	4.5925	6.4784	2.8551	3.1322	3.9312	3.8139	1.6697
ECBC M.	10.5000	8.3636	28.3182	28.1818	20.7273	13.7727	11.7727	27.5000
ECBC SD.	4.8549	3.0123	2.6482	2.3750	4.1367	4.9456	4.1874	2.8243
public services technician M.	11.4815	10.7593	26.2222	25.8519	19.0556	15.3786	10.4704	26.8889
public services technician SD.	4.2481	5.3688	4.5700	3.1912	3.5634	4.6294	4.7064	3.6051
educational assistant M.	11.3750	10.3750	26.2500	26.3750	19.7500	14.6250	12.7500	27.0000
educational assistant SD.	4.0968	4.2564	5.5558	3.0883	3.3108	4.6458	4.2769	3.7594
Capital M.	9.3000	8.0000	27.5000	28.5000	20.5000	10.3000	8.5000	29.0000
Capital SD.	2.8868	2.3094	0.5774	1.7321	6.3509	1.7321	1.7321	0.0000
City M.	9.9992	9.0612	27.2941	26.2349	19.3061	11.9184	9.4286	27.7755
City SD.	3.2105	4.2713	4.2303	2.6653	4.0314	4.6166	3.5581	3.8156
Small town M.	11.2000	10.7619	26.0000	25.5810	18.8333	15.7810	11.0571	26.5905
Small town SD.	4.3273	4.8408	4.9727	3.2467	4.0506	4.9417	4.7599	3.6173
Small settlement M.	9.2500	10.2500	23.5000	23.7500	18.0000	12.5000	11.2500	26.5000
Small settlement SD.	3.7321	4.9201	4.3093	4.3012	3.9040	2.7775	3.7259	3.7417
Age 14 M.	8.8519	8.1852	27.1852	25.2963	19.8333	13.0370	10.0370	27.4707
Age 14 SD.	1.8572	2.8687	4.0472	3.0937	4.5988	5.7854	3.4145	2.4815
Age 15 M.	10.2041	9.4694	26.6531	26.6735	19.1837	14.5710	10.6531	27.6939
Age 15 SD.	3.5868	3.9277	5.2820	2.8020	4.9102	4.6750	4.1152	2.8932
Age 16 M.	10.6667	10.5000	26.5000	25.3839	18.7778	16.0000	10.7222	26.3333
Age 16 SD.	4.5732	3.5039	3.7531	3.3147	3.4255	4.3818	5.8340	3.7645
Age 17 M.	14.1200	13.8800	24.0000	23.5200	18.1600	16.6800	12.7200	23.8400
Age 17 SD.	4.6187	5.6230	4.5804	3.0388	3.1543	3.8515	4.8963	3.7977
Age 18 M.	10.6333	9.6333	26.9667	26.4667	19.1333	15.8000	9.1333	27.6333
Age 18 SD.	3.6030	4.5435	4.1862	2.9999	3.4615	4.3981	3.6799	2.9051
Age 19 M.	10.6364	8.5455	26.7273	26.7273	17.2727	15.0000	9.7273	28.3636
Age 19 SD.	4.3485	4.7082	5.6246	1.8563	3.7056	5.9040	4.6412	3.0323

Note: *mean; **standard deviation

Table 6: The averages and the standard deviations of the QTI variables in terms of the background variables

Source: own editing

We found the following significant differences in terms of:

- the gender concerning variable STR (Mann–Whitney $U=7454.000$; $p=0.002$);
- profession concerning variables ADM (Kruskal–Wallis $H=14.793$; $p=0.011$); SRE (Kruskal–Wallis $H=22.687$; $p<0.001$); STR (Kruskal–Wallis $H=11.928$; $p=0.036$), and UNC (Kruskal–Wallis $H=12.048$; $p=0.034$);
- the type of the residence DIS (Kruskal–Wallis $H=12.581$; $p=0.006$); HFR (Kruskal–Wallis $H=10.577$; $p=0.014$); STR (Kruskal–Wallis $H=18.202$; $p<0.001$); UNC (Kruskal–Wallis $H=8.107$; $p=0.044$); UND (Kruskal–Wallis $H=9.689$; $p=0.021$);
- the highest education qualification of the mother DIS (Kruskal–Wallis $H=13.928$; $p=0.008$); HFR (Kruskal–Wallis $H=12.859$; $p=0.012$); LEA (Kruskal–Wallis $H=16.305$; $p=0.003$); STR (Kruskal–Wallis $H=13.064$; $p=0.011$) and UNC (Kruskal–Wallis $H=10.751$; $p=0.030$);
- the highest education qualification of the father ADM (Kruskal–Wallis $H=9.895$; $p=0.042$); DIS (Kruskal–Wallis $H=10.637$; $p=0.031$); STR (Kruskal–Wallis $H=12.703$; $p=0.013$) and UND (Kruskal–Wallis $H=18.003$; $p=0.001$);
- distance between residence and the high school SRE (Kruskal–Wallis $H=14.282$; $p=0.003$);
- the age ADM (Kruskal–Wallis $H=33.214$; $p<0.001$); DIS (Kruskal–Wallis $H=32.725$; $p<0.001$); HFR (Kruskal–Wallis $H=19.495$; $p=0.002$); LEA (Kruskal–Wallis $H=40.252$; $p<0.001$); STR (Kruskal–Wallis $H=18.665$; $p=0.002$); UNC (Kruskal–Wallis $H=19.726$; $p=0.001$) and UND (Kruskal–Wallis $H=54.649$; $p<0.001$);
- grade ADM (Kruskal–Wallis $H=29.714$; $p<0.001$); DIS (Kruskal–Wallis $H=21.546$; $p<0.001$); LEA (Kruskal–Wallis $H=11.826$; $p=0.037$); STR (Kruskal–Wallis $H=17.669$; $p=0.003$); UNC (Kruskal–Wallis $H=14.816$; $p=0.011$) and UND (Kruskal–Wallis $H=31.628$; $p<0.001$).

The research involved students from an age range from 14 to 19. Table 7 presents the lowest and the highest averages of the 8 QTI variants in terms of age distribution.

	ADM	DIS	HFR	LEA	SRE	STR	UNC	UND
Age 14	*		***		***	*		
Age 15								
Age 16								
Age 17	***	***	*	*		***	***	*
Age 18							*	
Age 19		*		***	*			***

Note: * lowest average, *** highest average in terms of age

*: lowest average, ***: highest average in terms of age distribution

Table 7: The lowest and the highest averages of the QTI variants in terms of age distribution

Source: own editing

As mentioned above, the research involved students from six different high school specializations: general nurse, healthcare assistant, child and youth supervisor, ECEC, public services technician, or educational assistant. Table 8 presents the lowest and the highest averages for the eight QTI variants.

	ADM	DIS	HFR	LEA	SRE	STR	UNC	UND
general nurse							*	
healthcare assistant			*	*	*	***		*
child and youth supervisor	*		***		***	*		***
ECEC		*						
public services technician	***	***						
educational assistant				***			***	

Note: * lowest average, *** highest average in terms of the eight specializations

*: lowest average, ***: highest average in terms of the eight specializations.

Table 8: The lowest and the highest averages of the QTI variants in terms of the specializations
Source: own editing

In the research, there were involved students with different places of residence: capital, city, small town, or small settlement. Table 9 presents the lowest and the highest averages for the 8 QTI variants.

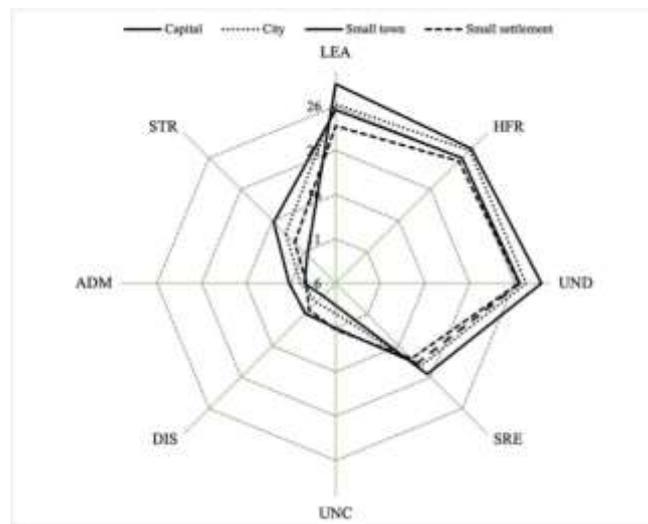
	ADM	DIS	HFR	LEA	SRE	STR	UNC	UND
Capital		*	***	***	***	*	*	***
City								
Small town	***	***				***		
Small settlement	*		*	*	*		***	*

Note: * lowest average, *** highest average in terms of the place of residence

*: lowest average, ***: highest average in terms of the place of residence.

Table 9: The lowest and the highest averages of the QTI variants according to the place of residence
Source: own editing

Figure 4 presents the distribution of the average of the responses provided by the students about their places of residence. Significant differences can be observed in the cases of DIS, HFR, STR, UNC, and UND octants. A detailed analysis is provided in part of the study, where the research questions are answered.



(Figure 4 here)

Figure 4: Comparison of the average values of QTI variables according to place of residence
Source: own editing

Factor analysis was also conducted to verify whether the research results confirmed the assignment of items to QTI variables. First, it was ensured that the variables were suitable for factor analysis. The Kaiser–Meyer–Olkin value was 0.880, which is considered good.

When determining the number of main components (factors), we applied the a priori method and did not set the number of factors. We aimed to approach the cumulative variance close to the expected minimum level of 60% in social science research, which ultimately amounted to 60,686% in the case of 8 factors. The Principal Component Analysis (PCA) was used for variable compression, and the well-established Varimax rotation was applied (Table 10).

Rotated Component Matrix^a

	Component							
	1	2	3	4	5	6	7	8
HFR5	.811	-.151	-.196	-.045	-.027	.137	-.060	.254
HFR4	.798	.029	-.188	.038	.048	.093	-.152	-.070
HFR3	.788	-.211	-.232	-.019	.241	.065	.055	-.073
HFR2	.698	-.121	-.063	-.064	.340	.164	.000	-.153
HFR6	.672	-.095	-.156	-.107	.322	-.007	-.003	-.024
HFR1	.649	-.307	-.114	-.020	.256	.090	-.026	.155
DIS3	-.544	.268	.167	.370	-.007	.163	.291	.263
DIS4	-.507	.433	.147	.174	-.138	.088	.133	.398
UNC6	-.050	.726	.133	-.040	-.063	.246	.147	-.062
UNC5	-.256	.732	.176	.174	-.181	.082	.132	.045
DIS1	-.143	.598	.104	.386	-.245	-.084	.054	.051
UNC3	-.180	.586	.378	.271	-.147	.095	.000	.379
UNC2	-.155	.575	.401	.170	-.172	.102	.256	.346
UNC4	-.085	.525	.298	-.064	-.018	.264	.018	-.024
LEA5	.213	.514	.026	.023	.477	-.025	.111	.228
LEA6	.357	.471	-.125	-.041	.374	-.119	.114	.183
UND2	.156	-.054	.701	-.145	.321	.055	.194	-.127
UNC1	-.120	.335	.814	.023	.051	.086	.228	.054
ADM1	-.228	.103	.882	.179	-.103	.081	.293	.126
UND3	.201	-.208	.813	-.076	.470	.055	-.018	-.115
LEA1	.124	-.125	.883	.129	.330	.035	.062	.275
UND1	.092	-.057	.541	-.082	.253	.048	-.113	.331
ADM4	-.289	.323	.502	.172	-.144	.062	.308	-.075
ADM2	-.048	.077	.426	.234	-.334	.099	.387	.247
ADM5	-.091	.256	.370	.141	-.331	.021	.343	-.050
STR4	.056	.080	.008	.821	-.024	-.131	.140	-.044
STR1	-.101	-.072	.180	.748	.019	-.188	-.140	.062
STR6	.007	.277	.083	.703	-.043	-.041	.065	.093
STR5	-.473	-.004	-.028	.848	.000	.024	.067	.021
STR3	-.121	.142	.004	.812	-.005	-.093	.366	-.138
STR2	.174	-.118	.196	.535	-.008	-.314	.071	.200
DIS5	-.175	.450	-.019	.496	-.218	-.164	.133	.078
UNC8	.220	-.093	-.288	-.054	.642	.053	-.055	.069
UNC6	.348	-.085	-.244	-.038	.831	.087	-.151	.088
LEA2	.283	-.178	-.423	.020	.604	.088	.155	.048
LEA3	.094	-.364	-.286	.006	.576	-.071	-.117	.062
ADM6	-.120	.161	.107	.180	-.522	.164	.211	.397
UND4	.334	-.340	-.398	-.126	.412	-.154	.069	.120
BRE4	-.188	.257	.060	-.040	.037	.765	-.013	.081
BRE2	-.077	.212	.073	-.103	-.005	.756	.048	.034
BRE3	.094	.140	-.033	-.097	.050	.729	.008	-.193
BRE8	.114	.021	.084	-.216	-.052	.721	.012	.114
BRE5	.300	-.047	-.060	-.021	-.260	.650	.003	-.098
BRE1	.161	-.141	-.082	-.082	.187	.598	-.209	.004
ADM3	.007	-.018	.076	.066	.073	-.131	.888	-.023
DIS8	-.151	.370	.176	.238	-.198	.110	.596	.146
DIS2	-.399	.254	.005	.206	-.210	-.075	.483	.394
LEA4	.017	-.040	-.089	.015	.159	-.088	.010	.675

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 10 iterations.

Table 10: Rotated Component Matrix
Source: own editing

Taking the sample size into account for the interpretation of the factors, the minimum value of factor loading was determined to be 0.35. Considering the rotated factor loading matrix, the assignment of items to factor variables was surprising. Some factors, such as Factor 7, entirely confirmed a QTI variable, as the same items were assigned to the factor as the ones contemplated by those compiling the questionnaire (factor loadings fell between 0.598 and 0.765).

There are factor variables (e.g., 1 and 4) in which items from multiple original variables are reflected, but there are also less identifiable factor variables (e.g., 2 and 3) because the factor loadings of items associated with them are distributed among multiple factor variables. The interpretation of individual factors was as follows (N = 326 participants):

- F1: This factor consists of 8 items, which are made up of 2 different dimensions (HFR: 5 and DIS: 2). It can be observed that all the six dimensions of HFR are included in this factor. HFR dimension encompasses positive evaluations of teacher collaboration skills, while the 2 DIS dimensions encompass negative evaluation of the teacher collaboration skills.
- F2: This factor includes almost the entire uncertain, indecisive (UNC) dimension (5 out of 6), 1 question of the DIS dimension (dissatisfied, skeptical), and 2 questions of the LEA dimension (directive, decisive).
- F3: This factor consists of 9 items, which are made up of 4 different dimensions (ADM: 4, LEA: 1, UNC: 1 and UND: 3). In this factor, the ADM dimension is dominant since 4 out of 6 questions are included in Factor 3.
- F4: This factor entirely includes the strict, assertive (STR) QTI variables, and 1 question of the DIS dimension (dissatisfied, skeptical).
- F5: This factor consists of 6 items, which are made up of 3 different dimensions (ADM: 1, LEA: 2 and UND: 3).

- F6: This factor entirely includes the student responsibility (SRE) dimension QTI variables.
- F7: This factor consists of 3 items, which are made up of 2 different dimensions (ADM: 1 and DIS: 2). The negative evaluations of teacher collaboration skills can be found behind these two variables.
- F8: This factor consists of 1 item from the LEA dimension.

In conclusion it can be stated that the factor analysis of the results obtained in the study does not fully reflect the QTI variables.

IV. DISCUSSION AND ANSWERS TO THE RESEARCH QUESTIONS

The first research question (Q1) „What do Hungarian high school students think about the ideal teacher interaction?” addressed the ideal teacher interaction. According to the high school students participating in the research, ideal teacher interaction is characterized by low values in the DIS, UNC, and ADM dimensions. Based on the research findings, the ideal teacher interaction is characterized by low values in dissatisfied, uncertain, and admonishing attitudes.

In contrast, according to high school students participating in the research, ideal teacher interaction is characterized by high values in the LEA, HFR, and UND dimensions. Based on these findings, the ideal teacher interaction is characterized by high values in leading, helpful, friendly, and understanding attitudes. Regarding the SRE and STR dimensions, we cannot speak of either high or low values. Based on these findings, it can be concluded that the opinions of the respondents (Hungarian high school students) differ in these two dimensions (standard deviation shows the highest value in the STR dimension) regarding the ideal interpersonal behavior.

The second research question (Q2) aimed to answer whether or not there are differences between certain QTI variables in terms of the three background variables examined (age, profession, and place of residence). In terms of the age of high school students who completed the questionnaire, we observed significant differences in seven dimensions out of eight (with the exception of the SRE dimension). According to the 14-year-old students involved in the research, the scolding and warning teacher attitude characterizes the ideal teacher much less than it does according to the 17-year-old students. The dissatisfied and skeptical attitude characterizes the ideal teacher much less according to the 19-year-old students than it does according to the 17-year-old students. The helpful and friendly attitude characterizes the ideal teacher much less according to the 17-year-old students than it does according to the 14-year-old students. The controlling and assertive attitude characterizes the ideal teacher much less according to the 17-year-old students than it does according to the 19-year-old students. The strict and firm attitude characterizes the ideal teacher much less according to the 14-year-old students than it does according to the 17-year-old students. The uncertain and decisive attitude characterizes the ideal teacher more according to the 17-year-old students than it does according to the 18-year-old students. The understanding and consensus-seeking attitude characterizes the ideal teacher most according to the 19-year-old students, while least according to the 17-year-old students.

According to respondents (high school students) based on their specialization of study, we observed significant differences in four dimensions: ADM, SRE, STR, and UNC. The scolding and warning teacher attitude characterizes the ideal teacher much more according to students studying in the public service technician program than according to students studying in the child and youth supervisor program. The lenient and kind-hearted teacher attitude characterizes the ideal teacher much more according to students studying in the child and youth supervisor program than according to students studying in the health care assistant program. The strict teacher attitude characterizes the ideal teacher much more according to students studying in the health care assistant program than according to students studying in the child and youth supervisor program. The uncertain teacher attitude characterizes the ideal teacher much more according to students studying in the educational assistant program than according to students studying in the general nursing program.

Regarding the type of residence of high school students who completed the questionnaire, we observed significant differences in five dimensions: DIS, HFR, STR, UNC, and UND. In the case of the DIS dimension, we found that high school students living in the capital city perceive the ideal teacher interaction as showing less dissatisfied behavior towards students compared to the opinion of students living in small towns. Regarding the HFR dimension, we found that in the examined sample, high school students living in the capital city perceive the ideal teacher interaction much more friendly and helpful than the students living in small settlements. Regarding the STR dimension, high school students living in the capital city perceive the ideal teacher interaction less strict than the students living in small towns. Regarding the UNC dimension, respondents living in the capital city perceive the ideal teacher interaction less uncertain than the students living in small settlements. Regarding the UND dimension, respondents living in the capital city perceived that the ideal teacher interaction shows understanding behavior towards students (Figure 4).

The third research questions (Q3) targeted to answer the following research question: What differences or similarities can be observed in the assessment of teacher interaction when comparing the ideal teacher interaction styles perceived by teacher trainees in the Carpathian Basin with those of high school students in

Hungary? Tóth & Horváth (2022, 126) measured the attitude of teacher trainees toward the ideal interpersonal behavior in a previous study. They concluded that “according to teacher trainees in the Carpathian Basin, the ideal teacher interactions are characterized by high levels of directive, assertive, helpful, friendly, and understanding, consensus-seeking attitudes, while low values characterize uncertain, indecisive, dissatisfied, skeptical, and admonitory, warning attitudes.” (Trans. by László Dávid Szabó).

Therefore, the ideal interpersonal behavior of teacher students is characterized by high values of the following attitudes: leader, assertive (LEA), helpful, friendly (HFR) as well as understanding and consensus-seeking (UND). Additionally, low values characterize attitudes of uncertainty and indecisiveness (UNC), dissatisfaction and skepticism (DIS) as well as admonitory warning (ADM).

In the current research, the examined sample displayed low values in the DIS, ADM, and UNC attitudes, while showed high values in the LEA, HFR, and UND attitudes.

The attitudes marked with low values in our study align with the attitudes that received low scores in the ideal interpersonal behavior according to teacher students, as measured by Tóth & Horváth (2022), regardless to the order (UNC, DIS, and ADM). Similarly, attitudes receiving high scores (LEA, HFR, and UND) also showed consistency between the examined sample and the characteristics of interpersonal behavior considered ideal by teacher students. We can conclude that in the examined sample, the interaction style evaluated by the students aligns with the characteristics of the interpersonal behavior considered ideal by teacher trainees.

Always provide the DOI of each of your references if they have been assigned one, as recommended by the latest APA Style guidelines.

V. CONCLUSIONS

In the first section of our paper, we gave an overview of the theoretical background of teacher interaction, focusing on Wubbel's theory and the international results of the QTI measuring tool. We applied the Hungarian version of the QTI questionnaire which was elaborated by Tóth and Horváth in 2022. They used this questionnaire to apprehend the teacher students' opinions on ideal teacher interaction in the Carpathian Basin. In this study, our goal was to determine the high school students' opinions on the ideal teacher interaction in a Hungarian high school.

In this paper, we presented the results of our research conducted with the involvement of 326 high school students in Hungary. The research results show that Hungarian high school students perceive the ideal teacher interaction as characterized by low levels of dissatisfaction, uncertainty, and scolding or warning attitudes, while high levels of directive, helpful, friendly, and understanding, consensus-seeking attitudes. These findings align with the characteristics of ideal interpersonal behavior as perceived by teacher trainees in the Carpathian Basin. In terms of permissive, soft-hearted, strict, and assertive dimensions, there were no clear high or low values. These observations also match the characteristics considered ideal by teacher trainees in the Carpathian Basin. The highest variability was observed in the strict and assertive dimension. Table 6 shows that the averages in the strict and assertive dimension first increase (at the age of 14: 13.0370; at the age of 15: 14.5714; at the age of 16: 16.0000; at the age of 17: 16.6800), then decrease (at the age of 18: 15.8000; at the age of 19: 15.0000). This could be related to the psychological development stages of children, but further research would be needed to confirm this. At the age of 14, children enter adolescence, a period between childhood and adulthood. They are no longer fully supported in their child roles, and the adulthood roles are not fully acquired, yet. Adults may struggle to handle this situation (József, 2009). As children transition into adolescence, they may increasingly need a stricter and more assertive teacher attitude. However, as they approach the end of adolescence and move closer to adulthood, the demand for a strict and assertive teacher attitude may diminish.

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