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Probing School Image at High Schools: Scale Development and a Discriminant Analysis*

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Abstract

This study aimed at developing a valid and reliable measurement tool to determine school image at high schools and investigating the discrimination level of the scale among the students from different high school types in Turkey. Two studies were conducted to a) develop a valid and reliable measurement tool and b) to examine the discrimination power of the scale among students. The research was conducted in a province in Southeastern Turkey, and 668 students from six different high schools participated in the research in the 2017-2018 academic year. The construct validity of the scale was probed via exploratory and confirmatory factor analyses. The findings indicated that the School Image Scale (SIS) incorporated six factors (school-parent interaction, art-sports activities, student profile, teacher-administrator characteristics, student support services, and physical conditions) and 28 items. Results of discriminant analysis carried out with 300 students from 5 different high schools revealed that the sub-dimensions of the scale were effective in distinguishing between high schools. The most effective independent variable in distinguishing students studying at different school types was student profile, physical conditions, art-sports activities, teacher-administrator characteristics, student support services, and school-parent interaction variables, respectively. The related independent variables were discussed in order of importance in light of the relevant literature.

Keywords: School image, Scale development, Discriminant analysis, High schools, Students

Introduction

The term “image” has been defined and investigated in research contexts concerning profit and non-profit organizations, higher education institutions (HEIs) and schools from kindergarten to secondary level. Although image is suggested to have led to confusion due to the polysemy of the term itself (Beerli Palacio, Díaz Meneses, & Pérez Pérez, 2002) and its being more complex than the low-high continuum (Brown & Mazzarol, 2009) in the literature, it seems possible to compose an array of common aspects related to image of organizations. As an alive asset constructed based on both tangible and intangible elements of an organization (Karacabey, Özdere, & Bozkuş, 2016; Küçüksüleymanoğlu, 2015), or functional and emotional components (Kennedy, 1977; cf. Wilkins & Huisman, 2013), organizational image is proposed by Schuler (2004) to be a mental model holding cognitive, affective and sensorial information about the organization which is mostly received from many sources not usually controlled by the organization. It is a composite of various elements both reflecting and communicating the identity of an organization (Karaosmanoglu & Melewar, 2006). Accordingly, da Costa, Pelissari & Gonzalez (2018) proposed that image can be regarded as a snapshot of an organization based on cognitive and affective aspects in accordance with the observer and the one observed; and it reflects both internal and external stakeholders’ perceptions of the organization (Polat, 2011). Consistently, Kazoleas, Kim, and Moffitt (2001) advocate that organizational image is the result of the complex and multifaceted struggle of attributes processed by individuals through the messages from the organization and social, historical, personal lived experiences, and material factors. It is a feature ascribing to a translation of impressions constructed as a result of the individuals’ interaction with various organizational components (da Costa & Pelissari, 2016).

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School image refers to a school's predominating picture among the stakeholders of the schools. Perceptions and impressions regarding the activities and the study program of the school describe the school image (Eger, Egerová, & PISOŇOVÁ, 2018). School image serves as a critical tool for the improvement of school reputation and for school choice among students, teachers, and parents (Wong, Woo, & Tong, 2016; Köybaşı, Uğurlu, & Ceylan, 2017). In an atmosphere of contesting marketing and branding activities, it can also help schools to recruit and retain students at schools and spread positive word-of-mouth (Li & Hung, 2009). School image, as put by Wong et al. (2016), is crucial for the improvement of school reputation through satisfying students. Strong image perceptions by stakeholders can lead them to find the school highly attractive, which may positively affect their loyalty to the school (Akman & Özdemir, 2019).

Research on school image and reputation indicates that various aspects of school can be critical for students' and parents' school choice (Nartgün & Kaya, 2016) and affect student behavior. Alikasifoglu, Erginoz, Ercan, Uysal, Kaymak, et al. (2004), for instance, revealed that poor school image, among other variables, was correlated with the fighting behaviors of the students. Consistently, Aras, Günay, Özcan, and Orcin (2007) unearthed that fourth-year high school students' most anomalous behaviors were associated with their schools. Polat (2011) found evidence on the relationship between organizational image and student achievement. Moreover, as the Hesapçioğlu and Nohutçu (1999) study demonstrated, parents paid more attention to the history of the school (i.e. being an established one), the physical conditions and position of the school, the instructional process, and teachers' professional competencies, which are some of the main elements of school image, while preferring private schools. The quality of professors (Marič, Pavlin, & Ferjan, 2010) or teachers (Malik et al., 2015) and of their lectures and learning content (Marič et al., 2010), the teaching quality (da Costa & Pelissari, 2016), the educational programs provided (Karacabey et al., 2016), resources and training of graduates (Lafuente-Ruiz-de-Sabando, Zorrilla, & Forcada, 2018), the physical conditions (Bakioğlu & Bahçeci, 2010), program features and characteristics, entry requirements, level of tuition fees and campus location (Wilkins & Huisman, 2013) are all the topics explored to be image-related for educational organizations.

Although there is a burgeoning body of research on higher education institutions' image (i.e. university image) (see, for example, Atabek & Atabek, 2015; Cerit, 2006; Lafuente-Ruiz-de-Sabando et al., 2018; Karacabey et al., 2016; Pampaloni, 2010; Pérez & Torres, 2017; Polat, 2011; Lee & Chen, 2018; Uluçay, 2018; Alcaide-Pulido, Alves, & Gutiérrez-Villar, 2017; Şişli & Köse, 2015), few research studies have focused on the image of K-12 schools. For example, the Van Wyk and Bisschoff (2012) study was centered on the development of an image scale for South African high schools. Eger et al. (2018) examine school image as a concept and present the application of a measurement tool developed based on the semantic differential method. Şeker (2011) developed a school attitude questionnaire including a few school image-related items, as well as other aspects, for elementary school students. Ereş (2011) conducted a study on Turkish basic schools' image and suggested further research on the images of high schools and colleges. However, the instrument used in the Ereş (2011) study was prepared to solicit public opinion regarding basic schools, and it was developed to be used for adults. In order to improve schools, it is required to investigate the image perceptions of students who are one of the main school stakeholders. Knowing what aspects or elements of schools are positively perceived and in which spectrums improvement is needed is a must for school leaders who play a pivotal role in fulfilling the expectations of both internal and external stakeholders. Positive image building is significant for building an appealing reputation over time and contributing to existing students' better outcomes at their schools and for newcomers to choose schools. Students' holding positive views of their school can positively affect the attitudes towards both the school and themselves as students (Şeker, 2011). This study, therefore, aimed at developing a valid and reliable measurement tool to determine the school image of high schools based on high school students' perceptions and investigating the discrimination level of the scale among the students studying at different high school types in Turkey. The findings obtained from the discriminant analysis are used to determine whether the sub-dimensions of the scale are effective in classifying students accurately.

Method

The present research had two-fold purposes; it, therefore, incorporated two different studies. First of all, a scale development study was conducted for high school students (Study I) and then the levels to which school image dimensions discriminated students of different high schools (Study II) were determined.

Study I (The School Image Scale development phase)

Research model

This research was designed as a scale development study that centered on using survey research in the development of a school image scale to be used for high schools.

The procedure

For the scale development study, a literature review was carried out first and it was determined to include seven dimensions (School-parent interaction, student support services, student profile, school administration, school achievement, teacher characteristics, and physical conditions of school) in the scale based on the conceptual framework and research findings by Bakioğlu and Bahçeci (2010), da Costa and Pelissari (2016), Eger et al. (2018), Karacabey et al. (2016), Lafuente-Ruiz-de-Sabando et al. (2018), Malik et al. (2015), Marič et al. (2010), and Van Wyk and Bisschoff (2012). An item-pool of 52 items was constructed in accordance with these dimensions. While constructing the pool, the researchers carefully examined the concept of school image and other related measurement tools. The 52-item form was structured as a five-point Likert type scale with the choices of “completely disagree, mostly disagree, somehow agree, mostly agree, and completely agree”. The form was presented to four measurement and evaluation experts, one curriculum and instruction expert, and one educational administration expert for checking the suitability of the items and to four experts working on image and school image for content validity. Based on the views of the experts, a draft form including 42 items, of which three were reversed, was constructed after removing 10 inappropriate or convergent items (see Appendix 1). Prior to the main implementation of the scale, a pilot study was conducted with 18 Anatolian High School students (10=female, 8=male) to check the comprehensibility of the items. The draft was finalized as the final form because the students did not mention anything about any items regarding the difficulty in understanding them. The data collected from 18 students were not added to the data obtained in the main study.

Study groups

A number of factors were observed in the selection of the study groups. In this vein, the research was conducted in a province in Southeastern Turkey, considering the principle of accessibility, and as it is the desired condition to reach out individuals with maximum heterogeneity in terms of the relevant characteristic to be measured, it was targeted to reach out the individuals with such potential in all types of high schools for data collection. Five out of eight high schools (Anatolian, Science, Social Sciences, Anatolian Vocational and Technical, Anatolian Imam Hatip, Military, Fine Arts, and Sports) opened by the Ministry of National Education (MoNE) were reached out in the study. Therefore, the data were collected from the students of six different high schools among which were a Science High School, two Anatolian High Schools, a Fine Arts High School, a Vocational and Technical Anatolian High School, and an Anatolian Imam Hatip High School in the first semester of the 2017-2018 academic year. The other types of high schools except for the said ones were not opened in the province by the MoNE, which could be considered as a limitation of the study. Furthermore, Science Project High School and Social Sciences Project High School were determined in 2017/June and 2015/June; for this reason, data were not collected from these schools due to the idea that school image regarding these schools may not have settled yet. The high schools from which data were collected had classroom sizes ranging between 10-35 students. Additionally, it was paid attention to gathering all of the data from 10th and 11th grade students in particular as it was believed that it was early for 9th grade students to recognize all aspects of the schools and 12th graders were kept out of study on the advice of school administrations due to students' preparation for university entrance exam. It was then decided that both 10th and 11th graders were ideal for the study, which made sampling criterion-based.

Both exploratory (EFA) and confirmatory (CFA) factor analysis were used. The data were collected from 668 high school students studying at different high school types. This number was determined after removing the data obtained from 5 female and 10 male students who marked the same choice for all of the items and/or mostly left unanswered items. It is suggested in the literature that it is appropriate to conduct EFA first and then CFA (Jöreskog & Sörbom, 1993). For this reason, EFA was done first, and CFA was carried out following EFA on different groups. The School Image Scale development study was conducted with the data collected from two different study groups. It is proposed to carry out EFA and CFA implementations on different groups in the literature (Fabrigar, Wegener, MacCallum, & Strahan, 1999), a similar procedure was therefore followed in the current study. Composite reliability (CR) and average variance extracted (AVE) were calculated using relevant formulae regarding the factor loadings belonging to the group data subjected to CFA, and discriminant and convergent validity of the scale was examined. Cronbach's alpha reliability coefficients were calculated based on the EFA and CFA data separately. Table 1 indicates the demographic information regarding study groups.

Table 1. Demographic Information Regarding the Study Groups

Variable	Level	EFA (f)	CFA (f)
		Common factor variance Alpha reliability	AVE CR Alpha reliability
Gender	Female	187	198
	Male	151	132
Grade level	10	137	117
	11	201	213
School	AIHHS	81	53
	AHS-A	43	64
	AHS-B	90	45
	FAHS	39	25
	VTAHS	85	33
	SHS	-	110
Total		338	330

As can be seen in Table 1, EFA was conducted on the data from 338 students, and CFA was performed with the data from 330 students. Of the EFA group (female $n=187$, male $n=151$), 81 students were at Anatolian Imam Hatip High School (AIHHS), 43 at Anatolian High School-A (AHS-A), 90 at Anatolian High School-B (AHS-B), 39 at Fine Arts High School (FAHS), and 85 at Vocational and Technical Anatolian High School (VTAHS). 137 students were 10th graders, and 201 were 11th graders. Among the CFA group (female $n=198$, male $n=132$) were 53 Anatolian Imam Hatip High School students, 64 Anatolian High School-A students, 45 Anatolian High School-B students, 25 Fine Arts High School students, 33 Vocational and Technical Anatolian High School students, and 110 Science High School (SHS) students. 117 students in the group were 10th graders, and 213 of them were 11th graders. Moreover, Cronbach's alpha reliability was calculated for both the EFA group and the CFA group separately. As suggested in the literature, EFA can be used for five-point Likert type scales when the number of the data collected is five times greater than the total number of the items in the scale (Cattell, 1978). For CFA, however, the data set should be 10 times greater than the total number of the items (Kline, 2011). Based on these suggestions, it may be asserted that the sample sizes reached out were adequate for EFA and CFA.

Collection of data

Permission was firstly taken from school administrations for data collection, and the data were gathered in the classrooms at a specified time. During the collection of the data, instructions were read to the participants, and detailed information was given to them regarding the significance of responding to all of the items and marking only one choice for each item. The significance of responding to each item sincerely was also mentioned, and it was assured that the data would be kept confidential.

Data analysis

EFA was performed in order to obtain evidence about the construct validity of the School Image Scale (SIS), and then the construct of the scale was confirmed through CFA. Composite reliability (CR) and average variance extracted (AVE) were calculated using relevant formulae regarding the factor loadings belonging to the group data subjected to CFA, and discriminant and convergent validity of the scale was examined. Cronbach's alpha reliability coefficient for the sub-dimensions was calculated. The analyses were performed using SPSS 20.0, IBM SPSS AMOS 20, and Microsoft Excel 10 programs.

Before performing EFA, the Kaiser-Meyer-Olkin (KMO) value was examined for the appropriateness of the data for factor analysis and Bartlett's Test of Sphericity results were investigated to determine normal distribution. The fact that the KMO value is greater than .60 and the result of Bartlett's Test of Sphericity is statistically significant means that the data is suitable for factor analysis. The results of the analyses demonstrated that the KMO value was .830; and chi-square value was significant [$\chi^2=3076.719$, $df=378$, $p<.01$], and it was decided that the data set was appropriate for EFA (Kalaycı, 2016; Şencan, 2005).

The principal component technique which is one of the various factorization techniques was preferred in EFA. Proposing that there were significant relationships between sub-dimensions of the scale (the correlation table given in the section regarding discriminant validity confirms this proposal), the varimax rotation technique was used in the research. The researchers benefitted from the eigenvalues and the scree plot of the scale to determine the factor number of the scale. The factors whose eigenvalues were over 1 were selected. As a result of the principal component technique, 12 factors whose eigenvalues were greater than 1 were determined for 42 items.

The contribution of these factors to the total variance was found to be 63.14%. The scree plot is presented in Figure 1.

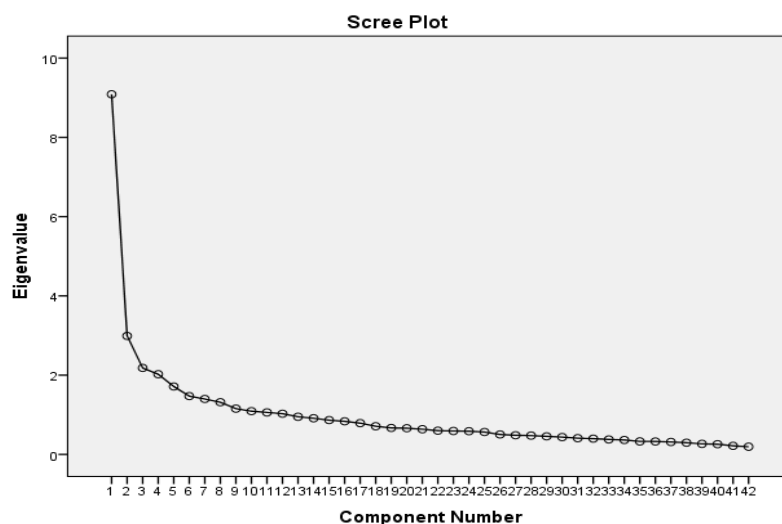


Figure 1. The scree plot regarding the SIS

When the scree plot in Figure 1 is examined, it can be seen that six factors had significant contributions to the explained variance, and the degree of the contribution of the factors was small and close to each other after the sixth one. Therefore, it was decided to repeat the factor analysis for six factors by paying attention to the number of factors specified in the theoretical framework during the scale development phase. The factor loadings of the items subjected to EFA were examined, and it was decided to eliminate the items with factor loadings below .45 (Tabachnick & Fidell, 2007); however, there were no items below .45. It was paid attention that one item had high loading in only one factor. It was accepted as a criterion that there was at least 0.1 difference between the factor loading of one item in one factor and other factors (Kline, 2011). Overlapping items were omitted from the scale respectively starting from the items with the highest overlapping according to the analyses, and the analyses were repeated each time. Thus, 14 items out of 42 were removed from the scale, and a scale including 28 items was obtained. EFA was repeated after the removal of 14 items, and it was revealed that the scale had six factors explaining 54.48% of the total variance. Principal components analysis in the EFA and varimax rotation indicated that a six-factorial construct explaining 54.48% of the total variance was congruent with theoretical explanations and interpretable. Table 2 shows the EFA results regarding the School Image Scale (SIS).

Table 2. EFA results regarding the SIS

Rotated factor loadings	Factors						Common factor variance
	1	2	3	4	5	6	
i32	.764	.069	-.010	-.056	.171	.096	.630
i36	.747	.197	-.076	-.024	.100	.164	.640
i33	.725	.194	.069	-.094	.070	.097	.591
i35	.694	.171	.053	-.032	-.090	.110	.535
i31	.665	.130	.094	-.201	.313	.031	.607
i34	.659	.088	.128	.019	-.039	-.043	.462
i37	.607	.296	.073	.059	.132	.086	.490
i22	.499	-.007	.168	.114	.290	.192	.411
i21	.468	-.024	.271	.207	.151	-.044	.361
i17	.352	.737	.102	.111	.003	.088	.698
i16	.316	.734	.099	.048	.033	.085	.659
i19	-.019	.673	.064	-.078	.317	-.103	.575
i18	.114	.654	-.007	-.029	.184	-.050	.478
i25	.226	.488	.104	.085	-.038	.373	.448

i3	-.017	-.007	.776	.097	.162	.109	.650
i2	.081	.081	.740	-.039	.023	-.079	.569
i1	.146	.187	.687	.027	-.039	.018	.531
i4	.202	-.001	.530	.125	-.031	.306	.432
i28	.001	.160	-.038	.735	-.041	-.040	.571
i5	.023	.049	.271	.683	.007	.190	.579
i6	-.027	-.129	-.104	.668	-.143	-.048	.497
i27	-.066	.012	.155	.602	.185	.164	.452
i39	.143	.145	.026	.000	.737	.189	.621
i40	.114	.179	.102	-.266	.711	.149	.654
i38	.240	.100	-.010	.202	.651	-.118	.546
i8	.013	.073	.101	.005	.065	.749	.581
i15	.188	-.091	-.033	.107	.182	.595	.443
i9	.344	.376	.184	.110	-.127	.471	.544
Explained variance %	15.966	9.747	8.035	7.572	7.228	5.932	
Eigenvalue	6.485	2.487	1.793	1.704	1.556	1.229	
Total explained variance 54.479%							

After the factor rotation, the first factor (teacher-administrator characteristics) was detected to include 9 items, the second factor (student profile) 5 items, the third one (school-parent interaction) 4 items, the fourth one (art-sports activities) 4 items, the fifth one (physical conditions) 3 items and the sixth factor (student support services) 3 items.

The items in the first factor of the School Image Scale (SIS) named “teacher-administrator characteristics” were rotated via varimax rotation technique, it was seen that the factor loadings of the items ranged between .468 and .764. The variance explained by this factor solely was 15.97%. The rotated factor loadings of the second factor, *student profile*, ranged between .488 and .737, and it explained 9.75% of the variance. The factor loadings of the factor “school-parent interaction” ranged between .530 and .776, and this factor explained 8.03% of the variance. The factor loadings of the items in the “Art-sports activities” were between .602 and .735, and it explained 7.57% of the variance. In the physical conditions factor, the factor loadings of the items ranged between .651 and .737, and the factor loadings of the items in the “student support services” factor were between .471 and .749. These factors explained 7.23% and 5.93% of the variance respectively. In the interpretation of the findings obtained from EFA, common factor variance must be considered too. Common factor variance is equal to the sum of the square roots of the factor loading of each item in the factors. Although there are different boundary values regarding common factor variance in the literature, it is proposed that the items whose common factor variance is below .20 are a significant indicator of heterogeneity and this means that these items must be removed from the scale (Tabachnick & Fidell, 2007). In this research, the lowest common factor variance was found to be .361, which referred to the homogeneity of the items.

The items were given current numbers after EFA (Appendix 1) and the final version of the scale consisting of six factors and 28 items were subjected to CFA. The maximum likelihood method was used as the items remained within the boundaries of the normal distribution as shown in the table. For the fit model constructed in CFA, a number of fit indices can be used according to the maximum likelihood method. Fit indices were found to be (CMIN/df)=1.848 good fit, RMSEA=.051 acceptable fit, AGFI=.858 acceptable fit, IFI=.905 acceptable fit, standardized RMR=.069 acceptable fit, CFI=.904 acceptable fit, and NNFI=.886 weak fit (Hair, Black, Babin, & Anderson, 2009; Hu & Bentler, 1999). Therefore, it may be asserted that the fit indices obtained in CFA for the six-factor construct of the scale were within the boundaries of acceptable and good fit indices and that the said construct is a valid model. In Appendix 2, standardized factor loadings regarding the six-factor construct of the School Image Scale (SIS) are presented. Table 3 demonstrates the values regarding each item’s means, standard deviations, skewness and kurtosis, and factor loadings, and CR and AVE values are calculated for each factor.

Table 3. Means, standard deviations, skewness, kurtosis, factor loadings, CR and AVE values regarding the SIS

Factors	Item no	FL	Means	Sd	Skewness	Kurtosis	CR	AVE
<i>Schoolparent</i>	i1	0.62	3.642	1.049	-.501	-.122	0.790	0.485
	i2	0.73	3.479	1.255	-.406	-.834		
	i3	0.71	3.088	1.175	-.104	-.770		
	i4	0.72	3.291	1.206	-.376	-.712		
<i>Artsports</i>	i5	0.91	3.315	1.334	-.268	-1.056	0.707	0.402
	i6	0.58	3.398	1.299	-.467	-.855		
	i7	0.58	2.906	1.357	.164	-1.131		
	i8	0.33	3.558	1.306	-.505	-.886		
<i>Stuprofile</i>	i9	0.75	4.049	1.045	-1.127	.848	0.710	0.366
	i10	0.92	4.058	.958	-1.013	.913		
	i11	0.38	3.470	1.154	-.403	-.564		
	i12	0.39	3.355	.961	-.347	.164		
	i13	0.35	3.833	1.140	-1.043	.561		
<i>Teachadminist</i>	i14	0.41	3.294	1.310	-.402	-.873	0.863	0.417
	i15	0.57	4.094	.977	-.937	.314		
	i16	0.73	4.079	1.052	-1.215	1.055		
	i17	0.65	4.300	.925	-1.327	1.309		
	i18	0.69	4.170	.962	-1.046	.571		
	i19	0.58	3.785	1.097	-.886	.326		
	i20	0.70	4.085	1.010	-1.026	.497		
	i21	0.76	4.300	.849	-1.365	2.234		
	i22	0.65	3.982	.967	-.835	.328		
	<i>Stusupport</i>	i23	0.37	3.652	1.199	-.580	-.516	0.676
i24		0.88	4.079	1.049	-1.049	.397		
i25		0.63	3.836	1.115	-.864	.094		
<i>Physicalcond</i>	i26	0.63	3.706	1.279	-.794	-.400	0.730	0.491
	i27	0.48	4.106	1.093	-1.251	.917		
	i28	0.92	3.736	1.141	-.842	.125		

As is seen in Table 3, skewness (-1.365 and .164) and kurtosis (-1.131 and 2.234) values ranged between -3 and +3 (Bentler, 2006), which indicated that the data were normally distributed. It was found that the factor loadings of the items ranged between .33 and .92 and that all of the items in the scale had adequate t values to explain latent variables. CR values were between .676 and .863. It is also stated that AVE values are required to be .5, but when CR value is over 0.6, 0.4 can be accepted to be sufficient for AVE (Fornell & Larcker, 1981). Furthermore, in all of the factors CR>AVE condition was met (Hair et al., 2009). All of these findings can be considered as evidence for the convergent validity of the scale. Findings regarding the discriminant validity of the scale are presented in Table 4.

Table 4. Findings regarding discriminant validity

		<i>Correlation matrix</i>					
		schoolparent	artsports	stuprofile	teachadminist	stusupport	physicalcond
<i>Factors</i>	schoolparent	.696*					
	artsports	.176	.634*				
	stuprofile	.239	.067	.605*			
	teachadminist	.276	.006	.479	.646*		
	stusupport	.275	.167	.325	.389	.660*	
	physicalcond	.157	-.014	.340	.391	.219	.701*

* AVE's square root

Table 4 shows that AVE's square root values related to each factor on the diagonal lines are greater than the correlations between the factors on the lines and columns. This situation can be regarded as evidence of the discriminant validity of the scale (Hair et al., 2009).

Reliability

For the reliability of the study, Cronbach's alpha reliability coefficients were determined for its factors, and they are presented in Table 5.

Table 5. Cronbach's alpha reliability coefficients

	Factor 1 (school parent)	Factor 2 (artsports)	Factor 3 (stuprofile)	Factor 4 (teach administ)	Factor 5 (stu support)	Factor 6 (physical cond)
Cronbach's alpha (for EFA group)	.686	.652	.761	.860	.500	.664
Cronbach's alpha (for CFA group)	.765	.606	.854	.916	.629	.774

The measurements whose reliability coefficients are equal to or above .70 are accepted to be reliable (Bernardi, 1994), and for the scales consisting of a small number of items, .60 and above can be accepted as sufficient for reliability (Sipahi, Yurtkoru, & Çinko, 2010). In light of these studies, the SIS can be accepted to be reliable.

Study II (Discrimination level of the sub-dimensions of the School Image Scale among students studying at different types of high schools)

Research model

The study was conducted using a correlational research model. Correlational research is conducted to elucidate important phenomena by identifying relationships among variables (Fraenkel, Wallen, & Hyun, 2012).

Study group

The study was done with the participation of 300 students (female=151, male=146), 60 students from each of five types of high schools which were Imam Hatip High School, Anatolian High School, Science High School, Fine Arts High School and Vocational and Technical Anatolian High School. 91 of the students were 10th graders, and 209 of them were 11th graders. The same procedures were followed in the selection of the sample for Study I and Study II. The explanations are not repeated here as they were given earlier.

Data collection tool

The procedures followed for reliability and validity of the scale developed to determine school image perceptions of high schools were presented under Study I.

Data analysis

The accurate classification proportion of students studying at Imam Hatip High School, Anatolian High School, Science High School, Fine Arts High School and Vocational and Technical Anatolian High School in terms of teacher-administrator characteristics, student profile, school-parent interaction, art-sports activities, physical conditions, and student support services which are the sub-dimensions of the School Image School was examined. Discriminant analysis was used in the research. Discriminant analysis is a robust statistical method that accepts quantitative variables as independent-predictive-discriminating variables and categorical variables illustrating group membership as dependent variables. Discriminant analysis is used to predict group membership, determine the variance proportion explained in the dependent variable by independent (quantitative) variables, and identify the significance order. In this research, high school membership was the dependent variable and the sub-dimensions of the SIS were the independent variables. In accordance with the purpose of the study, the data collected were analyzed using SPSS 20.0 program. There are some assumptions about discriminant analysis (Çokluk, Şekercioğlu, & Büyüköztürk, 2012; Kalaycı, 2016). Related assumptions and the explanations indicating that this research met these assumptions are provided below.

-The group size subjected to discriminant analysis must be 20 at least, and the sample size must be four or five times greater than the total number of the variables. 60 students from each of the five different high schools

participated in this research and the sample size was five times greater than six different independent variables ($n=300$), which shows that this assumption was met.

-Quantitative (predictive-independent) variables indicated multivariate normal distribution: School-parent: skewness: .249; kurtosis: -.599; art-sports: skewness: .202; kurtosis: -.730; stuprofile: skewness: -.117; kurtosis: -.789; teachadminist: skewness: -.107; kurtosis: -.737; stud-support: skewness: -.070; kurtosis: -.670; physicalcond: skewness: -.004; kurtosis: -1.051. These values evinced that multivariate normal distribution was ensured.

-Homogeneity of variance-covariance matrices: This assumption is one of the most fundamental assumptions of the method; however, discriminant analysis can be done in cases in which covariance matrices are not equal.

-Multicollinearity: As indicated in Study I, the correlation coefficients between the factors of the scale were rather low and this can be considered as evidence that there was no multicollinearity.

Findings

In this research, the accurate classification proportion of students studying at different high schools in terms of the sub-dimensions of the SIS (namely, teacher-administrator characteristics, student profile, school-parent interaction, art-sports activities, physical conditions, and student support services) was examined. In this sense, four functions were obtained in the analysis, and the eigenvalues regarding the functions emerged were 1.404, .821, .316, .038 respectively, as shown in Table 6.

Table 6. Eigenvalues regarding the functions

Function	Eigenvalue	Variance %	Cumulative %	Canonical correlation
1	1.404 ^a	54.4	54.4	.764
2	.821 ^a	31.8	86.3	.671
3	.316 ^a	12.3	98.5	.490
4	.038 ^a	1.5	100.0	.191

a. The first 4 canonical discriminant functions were used in the analysis.

It is proposed that when eigenvalue is "0", then the discriminant function does not have discriminating power; however when the function moves away from "0", the discriminating power of the function increases. Even though it is not certain for eigenvalue, the values over .40 are regarded as "good" (Kalaycı, 2016). Canonical correlation resembles eigenvalue but gets values between 0 and 1 and demonstrates that how good the function generated discriminates groups (Hilbe, 1992). As the dependent variable (school type) is five-categorical, four functions were generated as is seen in the table. If there is more than one discriminant function, it is then accepted that the first function is the greatest one and is more discriminating than the other ones (Çokluk et al., 2012). The canonical correlation regarding the first function was .76, and it was detected that the discriminating power of the other functions decreased more and more.

The first function explained 54% of the variance in the dependent variables. Furthermore, the size/degree of correlation between dependent variable groups and discriminant function depends on the size/degree of the coefficient of canonical correlation. The square of the canonical correlation coefficient gives the percentage of the explained classification in the dependent variable by independent variables. When the canonical correlation coefficients in Table 7 are examined, $(.764)^2=.58$ of the classification in the dependent variable was explained by the variables of the first function. The size of the eigenvalue regarding the first function generated via discriminant analysis, canonical correlation value and the explained variance indicated that the first function was most effective in distinguishing/classifying between groups.

Wilks' Lambda results testing the significance of discriminant functions are provided in Table 7. Because the first function had the greatest effect in discriminating groups, the significance test results regarding the first function are presented in Table 7.

Table 7. Wilks' Lambda test results

Function	Wilks' Lambda			
	Wilks' Lambda	Chi-square	df	p
1 - 4	.167	525.024	24	.000

As can be seen in Table 7, the chi-square value for the first function's Wilks' Lambda statistics was significant [$\chi^2(1) = 525.024; p < .01$]. This finding can be interpreted that predictive (independent) variables generated by

the first function had a significant effect in distinguishing between groups in the dependent variable (Tabachnick & Fidell, 2007). Whether the independent variables (the sub-dimensions of the SIS: teacher-administrator characteristics, student profile, school-parent interaction, art-sports activities, physical conditions, and student support services) included in the research had a significant effect in distinguishing between groups was investigated. Table 8 demonstrates the results of Wilks' Lambda test for the equality of group means.

Table 8. The results of Wilks' Lambda test for the equality of group means

Independent variables	Wilks' Lambda	F	df1	df2	p
schoolparent	.751	24.390	4	295	.000
artsports	.649	39.964	4	295	.000
stuprofile	.527	66.180	4	295	.000
teachadminist	.635	42.422	4	295	.000
stusupport	.770	21.971	4	295	.000
physicalcond	.586	52.110	4	295	.000

As indicated in Table 8, the independent variables had significant effects on distinguishing between all of the groups (school types). When Wilks' Lambda value gets closer to 0, then it means that the relevant variable's contribution increases. However, when Wilks' Lambda value gets closer to 1, then it can be interpreted that group means are similar and no discrimination can be made between groups (Diekhoff, 1992). In this sense, the independent variables which made the greatest contribution to the discriminant function were student profile, physical conditions, teacher-administrator characteristics, art-sports activities, school-parent interaction and student support services, respectively.

Table 9 demonstrates the coefficients regarding the standardized discriminant function which determines the contribution of each independent variable to the discriminant function. Relevant coefficients resemble beta coefficients of the variables in regression analysis.

Table 9. Standardized canonical discriminant function coefficients

Variables	1	2	3	4
schoolparent	-.086	.330	.440	-.553
artsports	-.395	.703	-.080	.351
stuprofile	.630	.073	-.642	.101
teachadminist	.184	.434	-.268	-.561
stusupport	.112	.108	.228	.739
physicalcond	.543	-.328	.760	.116

The most effective independent variable in distinguishing between students studying at different school types was student profile (.630) as demonstrated in Table 10. The student profile variable was followed by physical conditions (.543), art-sports activities (-.395), teacher-administrator characteristics (.184), student support services (.112) and school-parent interaction (-.086) variables, respectively. Pearson correlation coefficients demonstrating the relationship between student profile, physical conditions, art-sports activities, teacher-administrator characteristics, student support services, and school-parent interaction variables and discriminant function are presented in Table 10.

Table 10. Pearson correlation coefficients

Variables	1	2	3	4
stuprofile	.738*	.286	-.455	.116
physicalcond	.640*	.062	.634	.070
artsports	-.170	.774*	.115	.357
schoolparent	.078	.563*	.419	-.409
teachadminist	.497	.521*	-.004	-.375
stusupport	.315	.399	.219	.567*

* The largest absolute correlation between each variable and any discriminant function

When the matrix coefficients are examined in Table 10, it can be seen that the independent variable with the highest correlation with the discriminant function was student profile (.738); and the one with the lowest correlation with the discriminant function was school-parent interaction (.078). There were positive correlations between student profile, physical conditions, teacher-administrator characteristics, student support services, and school-parent interaction and the discriminant function; however, the art-sports activities variable had a negative

correlation with the discriminant function. Last, the results regarding the function's classification of the dependent variable (i.e. grouping students into their schools) are presented in Table 11.

Table 11. Accurate classification percentage of the dependent variable

School	Predicted group membership					Total
	Anat. Imam Hatip HS	Anat. HS-B	Science HS	Fine Arts HS	Voc.-Tech. Anat. HS	
Anat. Imam Hatip HS	41	5	9	0	5	60
Anatolian HS-B	2	35	11	4	8	60
F Science HS	8	4	42	6	0	60
Fine Arts HS	2	7	1	42	8	60
Voc.-Tech. Anat. HS	4	4	0	0	52	60
% Anat. Imam Hatip HS	68.3	8.3	15.0	.0	8.3	100.0
% Anatolian HS-B	3.3	58.3	18.3	6.7	13.3	100.0
% Science HS	13.3	6.7	70.0	10.0	.0	100.0
% Fine Arts HS	3.3	11.7	1.7	70.0	13.3	100.0
% Voc.-Tech. Anat. HS	6.7	6.7	.0	.0	86.7	100.0
<i>70.7% of original grouped cases correctly classified.</i>						

According to the classification results presented in Table 11, 41 out of 60 Imam Hatip HS students (68.3%), 35 of 60 Anatolian HS-B students (58.3%), 42 out of 60 Fine Arts HS students (70%), 42 out of 60 Science HS students (70%), 52 out of 60 Vocational and Technical Anatolian HS students (86.7%) were correctly classified. The total accurate classification proportion of the discriminant function was 70.7%. This research aimed at revealing the accurate classification proportion regarding students studying at five different school types in terms of the sub-dimensions of the SIS. The research was conducted with 60 students from each other high schools selected (n=300). Therefore, each student group constructed 20% of the sample. In other words, the selection proportion regarding student groups from each school was 20%. The maximum chance criterion was 20%, and the proportional chance criterion was $0.20^2+0.20^2+0.20^2+0.20^2+0.20^2=0.20$. The accurate discrimination level had been found to be 70.7%, which means that the accurate discrimination level of the discriminant function was higher than the chance criterion.

Discussion and Conclusion

The image of a school relates to some core aspects such as the quality of teaching staff, the lectures, learning content, teaching quality, educational programs and their features, resources, training of graduates, physical conditions of the school, entry requirements, level of tuition fees and campus location (Marič et al., 2010; Malik et al., 2015; da Costa & Pelissari, 2016; Karacabey et al., 2016; Lafuente-Ruiz-de-Sabando et al., 2018; Bakioğlu & Bahçeci, 2010; Wilkins & Huisman, 2013). Digging out stakeholders' impressions, especially those of students, of the schools and of related aspects are therefore vital for learning those perceived to be unsatisfactory and taking appropriate actions for improving and/or transforming school processes and/or aspects which may have substantial influence on students and positive outcomes and/or behaviors. Image perceptions render into key instruments in school reputation over time, which also dominates student perceptions even before attending a particular school type. The case of vocational and technical high schools in Turkey may be considered as an example of the transformation of negative image perceptions into undesired school reputation. Demir's (2017) study evinced this argument. He found that a great number of 8th-grade students held negative perceptions about vocational and technical high schools prior to attending them. With this in mind, the researchers, therefore, attempted to develop and validate a scale to be used to reveal students' image perceptions of high schools. The research included two studies in which scale development and discriminant analysis were carried out.

The sample of the study was comprised of 10th and 11th graders at five different types of high schools. The data were collected from 668 students of six different high schools (two schools were of the same type, i.e., Anatolian high school) in a province in Turkey, in the first semester of the 2017-2018 academic year. The analyses were performed using SPSS 20.0, IBM SPSS AMOS 20, and Microsoft Excel 10 programs. An item pool of 42 items was formed. Both exploratory (EFA) and confirmatory (CFA) factor analysis were used. EFA was conducted on the data from 338 students, and CFA was performed with the data from 330 students. 14 items out of 42 were removed from the scale, and a scale including 28 items was obtained. EFA was repeated after the removal of 14 items. The principal components analysis in the EFA and varimax rotation indicated that a six-factorial construct explaining 54.48% of the total variance was congruent with theoretical explanations and

interpretable. It was found that six factors had significant contributions to the explained variance. After the factor rotation, it was detected that the first factor (teacher-administrator characteristics) included 9 items, the second factor (student profile) 5 items, the third one (school-parent interaction) 4 items, the fourth one (art-sports activities) 4 items, the fifth one (physical conditions) 3 items and the sixth factor (student support services) 3 items.

As the CFA results indicated, fit indices were found to be (CMIN/df)=1.848 good fit, RMSEA=.051 acceptable fit, AGFI=.858 acceptable fit, IFI=.905 acceptable fit, standardized RMR=.069 acceptable fit, CFI=.904 acceptable fit and NNFI=.886 weak fit (Hair et al., 2009; Hu & Bentler, 1999). Skewness (-1.365 and .164) and kurtosis (-1.131 and 2.234) values indicated normal distribution.

Discriminant analysis was carried out with the participation of 300 students (female=151, male=146), 60 students from each of five types of high schools. The accurate classification proportion of students studying at different high schools in terms of the sub-dimensions of the SIS was also examined. In this sense, four functions were obtained in the analysis, and the eigenvalues regarding the functions emerged were 1.404, .821, .316, .038 respectively. The size of the eigenvalue regarding the first function generated via discriminant analysis, canonical correlation value and 54% of the variance concerning dependent variables by the first function indicated that the first function was most effective in distinguishing between groups. The chi-square value for the first function's Wilks' Lambda statistics was significant [$\chi^2(1) = 525.024$; $p < .01$]. The independent variables which made the greatest contribution to the discriminant function were student profile, physical conditions, teacher-administrator characteristics, art-sports activities, school-parent interaction and student support services, respectively. The independent variable with the highest correlation with the discriminant function was student profile (.738), and the one with the lowest correlation with the discriminant function was school-parent interaction (.078). 41 out of 60 Imam Hatip HS students (68.3%), 35 of 60 Anatolian HS students (58.3%), 42 out of 60 Fine Arts HS students (70%), 42 out of 60 Science HS students (70%), 52 out of 60 Vocational and Technical Anatolian HS students (86.7%) were correctly classified. The total accurate classification proportion of the discriminant function was 70.7%. The accurate discrimination level of the discriminant function was higher than the chance criterion.

The discriminant analysis performed in the current study yielded some results concerning students' views towards their schools, which may be an influencing factor for students' behaviors at schools and school belonging and engagement. In relation to students' school image perceptions, the student profile was at the forefront of other dimensions. The perceived student profile was seen to affect school image perceptions among students. Previous research demonstrated that the type of high school that students have enrolled affects their self and future perceptions. Sever et al. (2016) revealed that science and social sciences high school students view themselves better than those studying at vocational and technical high schools. Furthermore, students question their value and significance in reference to other types of high schools. Their perceptions regarding the quality of schools also count. According to Hanushek, Lavy, and Hitomi (2008), students recognize quality differences (low or high-quality school) and act based on them. In this study, it was explored that physical conditions were also important in terms of school image perceptions of the students. In the Cemalçılar (2010) study, the quality of the school's physical quality, the availability of in-class and out-of-class resources and the sense of security predicted students' positive perceptions about schools strongly. Having better experiences at schools are associated with positive feelings about school, and positive feelings are related to positive behaviors. Baker (1999) found out that the students expressing high satisfaction with their schools perceived their relationships with their teachers more caring and supportive than those expressing low satisfaction with their schools. Students' satisfaction with their schools has a significant role in determining their behaviors towards their schools (Elmore & Huebner, 2010).

Another important function was seen to be teacher-administrator characteristics. In a study by Cemalçılar (2010), it was found that students' satisfaction with social relationships at school and the general environment of the school predicted students' belonging to the school. School-level social contextual conditions are critical in understanding students' sense of school belonging. These conditions help students cultivate positive feelings towards schools. Students' interactions with teachers and school principals, in particular, contribute to the development of positive feelings towards schools. Teachers are reported to be among the factors decreasing school engagement (Arastaman, 2009). Students who think that teachers have good relationships with them and are caring, emphatic and fair and help solve their personal problems feel more belonged to their schools (Allen, Kern, Vella-Brodrick, Hattie, & Waters, 2018). In a similar vein, research indicates that teachers influence school and classroom engagement (See, for example, Skinner & Belmont, 1993; Uslu & Gizir, 2017). Improving schools in terms of physical structure and materials, making lessons more attractive for students, developing the quality and quantity of socio-cultural activities organized within the school can contribute to the

development of students' school belonging (Sarı & Özgök, 2014). Apart from these effective elements, parental involvement has also significant effects on student performance at school (Danışman, 2017). Therefore, developing students' images regarding their schools may help enhance their sense of school belonging and engagement, which may lead to better school outcomes.

It was concluded based on the results that the SIS is a valid and reliable measurement tool which can be used for determining students' perceptions of high schools and a discriminating power among students of different high school types. This research is not exempt from some limitations. First of all, only a limited number of school types were included in the study. Therefore, further research must be conducted with the participants from different high school types not included in the current study, and reliability and validity studies should be repeated accordingly. The scale can be used to reveal which students in what kind of high schools have lower or higher perceptions regarding their schools' image.

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Appendix 1:

Current no	No	Items	Completely disagree	Mostly disagree	Somehow disagree	Mostly agree	Completely agree
1	1	Okulumuz veli ile işbirliğine açıktır.	1	2	3	4	5
2	2	Okulumuz velilerle iletişim halindedir. (ev ziyaretleri, tlf vs.)	1	2	3	4	5
3	3	Okulumuzda okul aile birliği aktif çalışır.	1	2	3	4	5
4	4	Uygun öğrenme ortamı sağlayabilmek için okulumuz ve aileler ortak çaba gösterir.	1	2	3	4	5
5	5	Okulumuzda sanatsal çalışmalar önemsenir.	1	2	3	4	5
6	6	Okulumuzda sportif etkinlikler desteklenir.	1	2	3	4	5
	7	Okulumuzda konser, gezi, piknik gibi sosyal etkinlikler gerçekleştirilir.	1	2	3	4	5
23	8	Okulumuzda öğrencilere etkili rehberlik ve psikolojik danışmanlık hizmeti sunulur.	1	2	3	4	5
24	9	Okulumuzda üniversite sınavlarına hazırlık çalışmaları desteklenir.	1	2	3	4	5
	10	Okulumuzda öğrencilerin akademik gelişimi önemsenir.	1	2	3	4	5
	11	Okulumuzda alınacak kararlarda önce öğrenci yararı düşünülür.	1	2	3	4	5
	12	Okulumuzda bilimsel projeler, bilimsel araştırmalar teşvik edilir.	1	2	3	4	5
	13	Okulumuzda her öğrencinin farklı özelliklere sahip olduğu dikkate alınır.	1	2	3	4	5
	14	Okulumuzda öğrenci görüşlerine değer verilir.	1	2	3	4	5
25	15	Okulumuzda başarı ödüllendirilir.	1	2	3	4	5
9	16	Okulumuzdaki öğrenciler derslerine önem verir.	1	2	3	4	5
10	17	Okulumuzdaki öğrenciler başarılıdır.	1	2	3	4	5
11	18	Okulumuzdaki öğrenciler saygılıdır.	1	2	3	4	5
12	19	Okulumuzdaki öğrenciler okul kurallarına uyar.	1	2	3	4	5
	20	Okulumuzdaki öğrencilerin aileleri okul harcamalarından kaçınır.	1	2	3	4	5
14	21	Okulumuzdaki yöneticiler öğrencilere adil davranır.	1	2	3	4	5
15	22	Okulumuzdaki yöneticiler okulumuzun gelişmesi için gayret eder.	1	2	3	4	5
	23	Okulumuzdaki herkes uyulması gereken kuralları bilir.	1	2	3	4	5
	24	Okulumuzda yönetici ve öğretmenler işbirliği içerisinde çalışır.	1	2	3	4	5
13	25	Okulumuzdan mezun olanlar iyi bölümlere yerleşir.	1	2	3	4	5
	26	Okulumuzun herhangi bir alanda öne çıkan bir başarısı yoktur.	1	2	3	4	5
7	27	Okulumuz sanatsal alanda başarılı bir geçmişe sahiptir.	1	2	3	4	5
8	28	Okulumuz spor alanında başarılı bir geçmişe sahiptir.	1	2	3	4	5
	29	Okulumuz akademik olarak başarılı bir geçmişe sahiptir.	1	2	3	4	5
	30	Okulumuz çevrede tercih edilen bir kurumdur.	1	2	3	4	5
16	31	Okulumuzdaki öğretmenler öğrencilerine örnek davranışlarıyla model olur.	1	2	3	4	5
17	32	Okulumuzdaki öğretmenler iletişime açıktır.	1	2	3	4	5
18	33	Okulumuzdaki öğretmenler işini severek yapar.	1	2	3	4	5
19	34	Okulumuzdaki öğretmenler öğrencilerine adaletli davranır.	1	2	3	4	5
20	35	Okulumuzdaki öğretmenler alanında uzmandır.	1	2	3	4	5
21	36	Okulumuzdaki öğretmenler öğrenmemizi destekleyici tutumlar sergiler.	1	2	3	4	5
22	37	Okulumuzdaki öğretmenler sınıf ortamını yönetmede başarılıdır.	1	2	3	4	5
26	38	Okulumuzda güvenli oyun alanları mevcuttur.	1	2	3	4	5
27	39	Okulumuzun elektrik, su, ısınma vb. olanakları yeterlidir.	1	2	3	4	5
28	40	Okulumuz temizdir.	1	2	3	4	5

41	Okulumuzdaki derslikler bilgisayar, projeksiyon, akıllı tahta gibi gerekli teknolojik donanıma sahiptir.	1	2	3	4	5
42	Okulumuzun derslik ve koridorları boş duvarlardan ibarettir.	1	2	3	4	5

Factor 1 (schoolparent): i1, i2, i3, i4

Factor 2 (art-sports): i5, i6, i7, i8

Factor 3 (stuprofile): i9, i10, i11, i12, i13

Factor 4 (teachadminist): i14, i15, i16, i17, i18, i19, i20, i21, i22

Factor 5 (stusupport): i23, i24, i25

Factor 6 (physicalcond): i26, i27, i28

There are no reverse items in the scale.

Appendix 2

