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Abstract

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Keywords

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Student Perceptions of High-Achieving Classmates

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Abstract

The reported study investigated students' perceptions of their high-performing classmates in terms of intelligence, social skills and conscientiousness in different school subjects. The school subjects for study were examined with regard to cognitive, physical, and gender-specific issues. The results show that high academic achievements in particular school subjects lead to negative reactions in the peer group whereas high achievements in other school subjects result in positive peer reactions. In contrast, the respondents' gender and the gender of the successful classmates had little influence on student perceptions of high achievers. The results are discussed in regard to their implications for gifted education.

Key words: giftedness, academic achievement, peer perceptions, attitudes

Despite decades of research, a clear consensus on a definition of giftedness remains elusive (Sternberg, 2004). For a number of authors, giftedness is conceptualized as potential that leads to excellence or outstanding achievement (see, for example, Gagné, 1985, 2000). Whitmore (1985) suggested that “exceptional potential for learning and academic achievement in relation to chronological age peers” (p. 85). Nevertheless, there is general acceptance in the research literature that giftedness needs appropriate environmental catalysts to ensure that gifted performance ensues (Gagné, 2000; Sternberg, 2004). Consequently, a central aim of gifted education has been to help those identified as gifted realize their potential and attain high academic achievement (Clark, 1992; Perleth, Lehwald, & Browder, 1993; VanTassel-Baska, 2007).

The aim to assist students in developing their gifts is not unproblematic, however, as their cognitive needs are often seen to be in conflict with their social needs. For example, the practice of acceleration is strongly resisted because of perceptions that the gifted students’ social skills may be compromised (Colangelo, Assouline, & Gross, 2004; Vialle, Ashton, Carlon, & Rankin, 2001). Researchers have also consistently demonstrated that high intellectual abilities may inspire negative attitudes from individuals’ peers (Carrington, 1993; Tannenbaum, 1962), their teachers (Carrington & Bailey, 2000; Cramond & Martin, 1987), and society more generally (Geake & Gross, 2008). In their respective replications of Tannebaum’s (1962) classic study of adolescent attitudes toward the gifted, for example, Carrington and Bailey (2000) and Cramond and Martin (1987) reported that participants favored students who were average in ability, athletic and non-studious over those who were academically brilliant, studious and non-athletic.

The ultimate effect of societal ambivalence towards giftedness may be reflected in psychosocial issues for gifted individuals, which may lead to their hiding their abilities to “fit in” (Cross, Coleman, & Terhaar-Yonkers, 1991; Clasen & Clasen, 1995). Gross (1989) argued that many gifted individuals experience a forced choice dilemma whereby their pursuit of excellence threatens their social relationships with age peers, leading to a decision to underachieve in order to maintain those social relationships.

Not surprisingly, then, many gifted students report that their greatest problem derived from their exceptional potential leading to social troubles with peers (see, for example, Kerr, Colangelo, & Gaeth, 1988). For example, Manaster, Chan, Watt, and Wiehe (1994) revealed that, while gifted children mentioned some positive social aspects such as being respected and listened to, they also named social problems as the worst aspect of being gifted. Above all, the gifted students regarded stereotypes and labels such as “nerd” as particularly problematic (Manaster et al., 1994). Another study by Quatman, Sokolik, and Smith (2000) found that students experience relatively low assessments of their interpersonal attractiveness in consequence of their academic successes: their peers seemed to esteem academic talent less than talent in other areas (for example, student leadership, sense of humor, or athleticism).

As indicated previously, studies have shown that conscientiousness or studiousness exacerbates the social issues that may arise from high potential (Carrington & Bailey, 2000; Cramond & Martin, 1987). To further investigate factors that influence social acceptance of high-achieving students, Rentzsch, Schütz, and Schröder-Abé (2011) conducted a study, which showed that the effort expended by high-achieving male students, in particular, led to negative consequences such as being labeled a nerd. Similarly, Udvari and Rubin (1996) found that, while excellent achievements were

admired by gifted and non-gifted students alike, academic effort was not. Research indicates that students seem increasingly less willing over the course of their school career to speak about or demonstrate their school performance, in order to avoid being called conscientious or to drop in the popularity ratings of their peers (Hadjar & Lupatsch, 2010; Juvonen & Murdock, 1995; Pelkner & Boehnke, 2003). Such findings underscore the difficulty of the aim of gifted education to ensure that gifted students realize their potential in academic attainments.

School Subject-Specific Expectations and the Influence of Peers

Expectations can substantially influence students' educational careers. That is equally true for one's own expectations and the expectations of others (e.g. Stake & Nickens, 2005). For example, when mathematically talented girls are encouraged by counselors or teachers to realize their potential, it can be disadvantageous for them under some circumstances because of negative peer reactions (cf., Jacobs, 2005). While studies generally report positive correlations between social and academic competencies (Meijs, Cillessen, Scholte, Segers, & Spijkerman, 2010; Welsh, Parke, Widaman, & O'Neil, 2001), the relationship in gifted children is less clear (Colangelo & Kelly, 1983).

Expectations arise through social assumptions about the presence of typical characteristics of a person or a thing (cf. Hannover & Kessels, 2002, on expectations towards school subjects). As schooling occurs in social contexts, peer groups may play a central role in the formation of students' subject-specific interests or expectations (cf. Osborne, Simon, & Collins, 2003; Zacharia & Barton, 2004). Quatman et al. (2000) showed that adolescents have domain-specific perceptions of successful peers. Stake and Nickens (2005) assume that peers, with their varying

opinions about the attractiveness of studying, can decisively affect students' attitudes towards the selection of school subjects and, ultimately, occupations. Their study showed that peers can influence students' self-image as potential future scientists, for example.

According to "expectation-by-value" models (e.g. Heckhausen, 1991), decisions in favor of something are taken when a high level of success is expected, or when the thing has great value. Individuals' expectations of success are thought to be stronger the more they share qualities similar to those of a prototypically successful person in a field. If the successful persons are additionally associated with positive characteristics, the success seems connected with high prestige and thus also worthy of aspiration. That is, prototypical models of successful persons in certain fields may function as indicators for the value of specific activities or occupational positions. Similarly, Hannover and Kessels (2004) assume that for certain decisions, such as the choice of school courses or an occupation, a comparison takes place between the young person and a prototypical figure who is active or successful in the field (theory of self-to-prototype-matching). The greater the matching between them, the higher the probability is claimed to be of a person deciding in favor of the corresponding specialty/occupational field.

Although not concerned with high academic achievement but with preferences towards specific school subjects, the work by Hannover and Kessels strongly illustrates the negative image of the science subjects that might be transferrable to high achievement in this domain. Students with mathematics and science as favorite school subjects were ascribed less positive social characteristics, higher intelligence and more conscientiousness than those with favorite school subjects in languages and

the humanities (Hannover & Kessels, 2004; Kessels, Rau, & Hannover, 2006).

Comparing self-reported characteristics of highly gifted as well as moderately gifted students, Dauber and Benbow (1990) found that students had different views of themselves and their peer perceptions with the extremely verbally gifted adolescents seeming to feel less important and accepted.

Consequently, individuals who exhibit high performance are not always well-liked and high performance in a certain domain might lead to lower acceptance within a group. In particular, children and adolescents often associate high-level school achievement with negative social characteristics such as unpopularity (cf. Kessels, 2005). Thus, if a highly successful person in mathematics is unpopular, students' motivation to engage in this school subject may diminish due to negative consequences such as unpopularity. It could be concluded, then, that high academic achievement in particular school subjects might lead to negative reactions in the peer group whereas high achievement in other school subjects might result in positive reactions.

Gender-Specific Difficulties

The literature suggests, too, that gifted girls may be more susceptible to the psychosocial issues discussed thus far. For example, Kramer (1991), in her frequently cited study, reported that school-aged girls often intentionally conceal their talent and potential for fear of being perceived as unattractive or socially inept by peers. Although gifted adolescents, in general, are wary of the social consequences of being labeled gifted, gifted females are particularly conflicted about the social implications (Kerr et al., 1988; Swiatek, 1995). Similarly, Callahan, Cunningham, and Plucker (1994) found that middle-school girls downplay their

intellectual ability in order to fit in with their peer group. Some writers have suggested that many gifted females either downplay or devalue their abilities for fear of social isolation and ostracism by peers (e.g. Noble, 1989). Gifted girls often assume that boys do not like intelligent girls, and worry that demonstrating too much intelligence will make it difficult to find a boyfriend, and, ultimately, a husband (Hay & Bakken, 1991). There is some evidence confirming these social relationship fears of gifted girls. Luftig and Nichols (1991), for example, observed that academically gifted girls were the least popular of the four groups they classed by gender and as gifted or non-gifted (gifted boys, gifted girls, non-gifted boys, non-gifted girls). These results were replicated in a recent study by Ziegler, Fidelman, Reutlinger, Neubauer, and Heilemann (2011).

Given that science and mathematics are considered male-dominated domains, the reported girl-specific problems might be even more dramatically evident in those school subjects. Girls showing success in male-dominated subjects like science or mathematics, for example, may be excluded by their peer group whereas successful boys in such school subjects may enjoy popularity. That is, the same academic results might lead to different reactions in the peer group, according to gender (see Kessels, 2005; Schurt & Waburg, 2007). Kessels (2005) investigated gender differences in relation to the popularity among peers of high performing students in physics. The study found that male students considered successful female peers as being less popular than were successful male peers. In another study, female students showed more anxiety of being labeled a nerd than did their male counterparts in the field of mathematics (Pelkner & Boehnke, 2003) suggesting that higher performance in mathematics might lead to a loss of image. These factors may well contribute to girls showing less effort in relation to science education (see the work by Jacobs,

Davis-Kean, Bleeker, Eccles, & Malanchuk, 2005). That is, the general finding that conscientious male students are considered nerds (Rentzsch et al., 2011) may need to take account of subject-specific considerations.

Aims of the study

Building on the research conducted to date, our study addresses four main questions. First, we are interested in the question of subject-specific differences. Therefore, we investigated what perceptions students have of classmates who are high-achievers in various school subjects. Second, we were interested in the perceptions adolescents have of high-achieving peers in terms of cognitive and social variables in general, that is, without regard to any specific school subject. We focused on the influence a student's gender has on his or her attitudes toward high-achieving peers. Drawing on Rentzsch et al. (2011), we assumed that boys, in the presence of high-achieving peers, feel a greater pressure themselves to achieve, and therefore judge these peers negatively.

Third, in addition to the influence of students' own gender on their perceptions, we examined whether those perceptions differ according to the gender of a hypothetical new student. We asked whether adolescents perceive different qualities from high-achieving girls than from high-achieving boys. Finally, we were interested in several interaction effects: Do girls perceive different qualities from high-achieving girls than from high-achieving boys, and do boys perceive similarly differing qualities from high-achieving boys and girls respectively? Do students' expectations about the investigated school subjects interact with the gender of the respondents, and/or with the gender of the high-achieving individuals? For example, we expected that male students, in general, would judge successful peers more negatively, but that the

opposite pattern of results would emerge in mathematics or science compared to languages.

Method

Participants

In total 103 tenth-grade students (year of birth was 1992 to 1994) from five school classes of two German *Gymnasien*¹(secondary schools) comprised our sample. The gender distribution was 50.5% female and 49.5% male.

Measurements

The participating students were presented the following scenario: *Imagine a new student is to join your class. The only thing you know about the new student is that he or she in his/her previous class was the best in the school subject XY [sciences, mathematics, languages and sports subjects²].* The school subjects were chosen with regard to cognitive, physical, and gender-specific issues. For the cognitive domains traditionally associated with males, science and mathematics were chosen, while for the cognitive domain traditionally associated with females, language subjects were chosen. For a physical domain traditionally associated with males, sports subjects were selected.

Students were asked to indicate their perceptions of the new classmate in relation to a list of pre-defined characteristics. To gather the responses about perceptions of high-

¹ The German secondary school system is divided into different types of schools that differ in the degree students can achieve with Gymnasium as the track with the highest possible degree.

² In Germany – the country in which students under investigation were educated – sport is a regular and mandatory school subject, usually with two lessons a week.

achieving peers, a total of 80 questionnaire items were asked, with 20 items each for the school subjects of sciences, mathematics, language, and sports. Ten of the items dealt with the hypothetical new male student, and ten with the hypothetical new female student. The items were to be answered on a 6-point Likert scale (from 1 – “totally disagree” to 6 – “totally agree”) for each hypothetical new female and male student and each school subject. The items were classified into three areas: intelligence, social competencies (positive social qualities) and conscientiousness. In total, eight versions were administered with each differing in the order of the presented school subjects in which high achievement is attained by the hypothetical student. The items relating to the hypothetical new high-achieving female student were asked first. The ten characteristics explored are listed as follows:

- He/she is intelligent.
- He/she is cool.
- He/she is nice.
- He/she is good-humored.
- He/she shares interest with other students.
- He/she is a good communication partner.
- He/she will be popular.
- He/she cares more for learning than for friends.
- He/she doesn't care for friends.
- He/she ingratiates him- or herself with teachers.

To test the postulated factor structure, for each of the ten items per school subject and gender of the high-achieving person, an explorative factor analysis with orthogonal rotation (Varimax) was calculated. The Kaiser-Meyer-Olkin criterion verified the sample adequacy for all analyses ($KMO = .75 - .85$). The scree-plots

indicated consistently a two-factorial solution, however, because the item “intelligence” is regarded as a strong explanatory factor in school performance, it was treated separately.

The internal consistencies for the resulting scales are displayed separately per school subject for the high-achieving new girl and the high-achieving boy in Table 1.

Cronbach’s α shows satisfactory values across all the school subjects and the gender of the high-achieving person.

– Please insert Table 1 about here –

Analysis Method

In order to determine whether adolescents differ in their perceptions of high achieving students in various school subjects (sciences, mathematics, languages and sports), repeated measurement analyses of variance were calculated. For each of the dependent variables – “intelligence”, “social competence” and “conscientiousness” – 2x4 analyses of variance with gender of the high achieving student (2 levels: male/female) and school subject (four levels: sciences, mathematics, languages, sports) as repeated measures factor and the gender of the respondent student as independent variable (mixed design) were calculated. Since the requirement of sphericity was not given, the Greenhouse-Geisser corrections were reported. In the presence of significant main or interaction effects, simple contrasts between all school subjects were calculated.

Results

Descriptive Results

The descriptive results in Table 2 show that the prototypical high-achieving students across all school subjects were not considered to be overly conscientious. High achieving students in the cognitive subjects were primarily ascribed intelligence, followed by social competencies. By contrast, in the presence of high achievement in sports subjects, positive social qualities seem to be more expected than high intelligence, that is, higher mean scores were provided for social competence than for intelligence.

– Please insert Table 2 about here –

Influence of the School Subject

For all the perceptions, significant and strong effects were observed in function of the particular school subject (see Table 3). That is, the respondent students differentiated in their perceptions of high-achieving classmates in accordance with the school subject in which the achievements were attained.

– Please insert Table 3 about here –

While the calculated contrasts do not distinguish between the sciences and mathematics, significant differences resulted for the perceptions of high-achieving classmates between all other investigated school subjects (see Table 4). Figure 1 shows that for high-achieving peers in sciences and mathematics, intelligence and conscientiousness were more emphatically expected in comparison to high-achieving peers in language and sports subjects. By contrast, respondent students expected less positive social qualities from high-achieving peers in science than they did from

high-achievers in languages and sports subjects. In addition, high achieving students were regarded as more intelligent, more conscientious but less social if the high achievement was attained in languages in comparison to sports subjects. With the exception of the differences between mathematics and science or mathematics and languages, respectively, all reported effect sizes are considered high.

– Please insert Table 4 and Figure 1 about here –

Influence of Respondent Gender

For the perceived qualities of intelligence and social competence, no significant differences were observed in relation to the respondent gender. For conscientiousness, however, a gender effect appeared ($F(1, 101) = 4.20, p < .05, \eta^2 = .04$) such that male students – independently of the high-achieving person's gender and the school subject in which the high achievements were attained – perceived more conscientiousness from high-achievers ($M = 2.86, SE = 0.10$) than did female students ($M = 2.57, SE = 0.10$).

Influence of the High-Achiever's Gender

The repeated measurement analysis of variance for the perceived intelligence and social qualities do not show significant differences in relation to the gender of the hypothetical high-achieving student. That is, in regard to these features, the respondent students exhibited no differing perceptions of high-achieving students. The only arbitrary indication for a difference due to the gender of the high achieving student was for the quality of conscientiousness ($F(1, 100) = 2.74, p = .101, \eta^2 = .03$). There was a tendency for high-achieving boys, independently of respondent gender,

to be perceived as more conscientious ($\underline{M} = 2.74$, $\underline{SE} = 0.07$) in comparison to high-achieving girls ($\underline{M} = 2.69$, $\underline{SE} = 0.07$).

Interaction Effects

The interactions between the gender of the high-achieving student and the respondent gender were not significant for any of the qualities investigated. The interactions between the school subject and the respondent gender with the gender of the hypothetical high-achieving person, respectively, also did not reach the significance level of $p < .05$. As a function of the gender of the high-achieving person and the school subject, the perceived social behavior slightly varied ($\underline{F}(3, 100) = 2.17$, $p = .102$, $\eta^2 = .02$). The within-subject contrast for the interaction for gender of the high achieving peer and the school subjects, science and languages, was significant ($\underline{F}(1, 100) = 5.77$, $p < .05$, $\eta^2 = .05$). The small effect indicates that, in science, high achieving boys were expected to be more social while, in languages, high achieving girls were seen as more social. The three-way interactions among respondent gender, gender of the high-achieving person and the school subject were not significant.

Discussion

In this exploratory study we examined the perceptions of students towards hypothetical peers who were high-achievers in four different school subjects. The chosen subjects were considered to have gender-stereotypical connotations (mathematics, science and sports subjects – masculinity; languages – femininity); three of them (mathematics, science and languages) were considered cognitive subjects, while sports activities belonged to the physical domain. Students were asked about their perceptions of classmates who were high-achievers in the four school subjects named, with regard to the three factors of intelligence, social

competence and conscientiousness. The study investigated differences relevant to the given school subject and gender, as well as possible interactions between the school subjects and the gender.

The image of the high-achieving student varied distinctly with the school subject in which the high achievement had been attained. Between science/mathematics — representing the difficult, male-dominated mathematics and “hard” science subjects — and the languages and sports subjects, there were clear differences relating to all three characteristics in question. High-achieving peers in the sciences and mathematics were considered more intelligent, more conscientious and less socially-minded than high-achieving peers in languages or sports subjects. In addition, high-achieving peers in languages were regarded as more intelligent, more conscientious and less socially-minded than high-achieving peers in sports subjects. These results are of importance because they show that successful peers are characterized differently as a function of the school subject in which their high achievement is attained. Success in mathematics and sciences seemed to be associated with high intelligence. Therefore it may be suspected that the hope of attaining high levels in math or science subjects – in comparison to languages or sports – is lower for most students. Hence, more effort is needed to achieve high levels in these school subjects. Furthermore, high-achieving students in science and mathematics were associated with somewhat negative qualities (conscientious, poor socializers). Consequently, the prestige of high achievement in sciences or mathematics should be less than that enjoyed from success in languages or sports as the students might avoid their efforts to succeed being recognized. The result of the negative image of science is in line with the research by Hannover and Kessels (2002). While their study examined

occupationally highly successful people (engineers) as prototypes, our study shows a similar pattern for high-achieving peers in various school subjects.

In addition, the unfavorable perceptions of students who are successful in science or mathematics might lead to difficulties in encouraging gifted students to engage in these school subjects. In contrast, putting effort into languages or even in sports subjects might be much more appreciated because of its lower visibility. In view of the low number of highly qualified persons in the areas of mathematics and science (see Taskinen, Asseburg, & Walter, 2008), this is an extremely disquieting finding.

Interventions are therefore needed to break up these patterns of expectations.

Interestingly, the demand seems to be greater for sciences than for mathematics. For example, in special extra-curricular courses, adolescents could interact with persons who are professionally active in science (cf. Hannover & Kessels, 2002; Scherz & Oren, 2006). Kessels et al. (2006) suggest that through the “de-activation” of negative representations during classroom instruction, long-term positive effects could be achieved. Another indication is found in a study by Parker and Rennie (1986) who demonstrated it was possible to change gender-specific stereotypes of students through a special teacher training.

Differences in the perceptions of girls and boys towards high-achieving girls and boys emerged only for conscientiousness. Boys considered high-achieving peers to be more conscientious than did girls. In addition, high-achieving boys were perceived by both genders as somewhat more conscientious than high achieving girls. In terms of the cognitive (intelligence) or social (social competence) factors, boys and girls revealed similar perceptions of high-achieving peers. Furthermore, adolescents did not differ in their perceptions of these characteristics in high-

achieving girls and high-achieving boys. The differences with regard to conscientiousness are possibly due to boys perceiving greater pressure to achieve and thereby feeling more easily threatened by better-performing peers. As a consequence, they probably behave more competitively and tend to ascribe other students' strong achievements to conscientiousness (cf. Rentzsch et al., 2011).

Interestingly, interaction effects between the school subjects and the respondent gender or the gender of the hypothetical high-achieving student were not meaningful. It may be judged positively that girls and boys have the same subject-specific perceptions since this means that girls are not exhibiting more negative stereotyping of the masculine-associated sciences in comparison to, for example, the feminine-associated languages. While Pelkner and Boehnke's study (2003) shows gender differences regarding the fear of being judged conscientious in mathematics, our study does not indicate that successful girls in mathematics and science were considered more conscientious than successful girls in other school subjects. This is an indication that the fear is possibly unfounded.

Only for the perceived social characteristics are there slight differences for high-achieving boys or girls among the school subjects (interaction effect of subjects with the gender of the hypothetical high-achieving person). High-achieving girls in languages were considered more sociable, independent of the respondent gender while in sciences they were perceived as less sociable than high-achieving boys. This indicates that, in conformity with the gender stereotype, positive social characteristics were ascribed when high achievement was attained in the gender-typed school subject. Fortunately, these gender-specific expectations did not apply to conscientiousness, which – with reference to Kessels (2005) or Schurt and Waburg

(2007) – would have been expected. Nevertheless, as peer relationships are an important factor in the development of children and adolescents (cf. Cornell, 1990), the subject-specific differences with regard to perceived social competences need further attention.

Educational programs such as the embedding of content into the daily world of students (context-based learning, cf. Bennett, Lubben, & Hogarth, 2007) seem to positively affect attitudes, interests and achievement. In addition, context-based learning can possibly lead to a more positive image of high-achieving girls in the sciences and thereby also have an effect on the perceived value of the school subject (cf. Haugwitz & Sandmann, 2009; Henderleiter & Pringle, 1999). Another promising approach to breaking dominant stereotypes among youth seems to be in establishing contact with successful persons in a given field, as shown by Asgari, Dasgupta and Gilbert (2010). Role models or mentors have also been shown to positively influence career choices in gender-atypical fields (see Fried & MacCleave, 2009; Grassinger, Porath, & Ziegler, 2010).

Limitations and perspectives

The strengths of our study reside in the comparison of students' specific perceptions of successful peers of both genders in four different, selected school subjects.

However, our study is limited to the extent that it provides no data on self-assessments that could indicate whether intra- and interpersonal perceptions correlate, that is, whether successful learners associate with themselves the same characteristics they do with high-achieving peers (cf. Farengy & Joyce, 1998).

Beyond that, the investigation of possible interaction effects dependent on the personal success/performance level would be interesting. Hence, the results from this

study rely on the students' perceptions and cannot be validated with outside sources such as actual achievement data. Furthermore, it is questionable what influence students' perceptions have on their behavior, that is, whether adolescents who associate successful individuals in mathematics and science with conscientiousness, for example, therefore work less diligently themselves in these school subjects.

It is remarkable that there are only weak gender differences, but striking differences in the perceptions in terms of the school subjects in which the high achievements were attained. If we extrapolate this pattern of results from the perceptions regarding high-performing peers to the image of mathematics and science subjects, it shows a clear need for subject-specific intervention. The development and implementation of intervention measures in mathematics and science subjects, however, requires further research in order to clarify the causes of the effects found in this study, that is, to answer why the perceptions of successful learners in different school subjects are different, and what causal patterns lie behind this finding.

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Tables

Table 1. Internal consistencies (Cronbach's α) for the newly constructed scales, separated by gender and school subject

Scale	No. items	Hypothetical successful female student				Hypothetical successful male student			
		Sciences	Mathematics	Languages	Sports subjects	Sciences	Mathematics	Languages	Sports subjects
Social competence	7	.90	.83	.96	.85	.92	.90	.89	.88
Conscientiousness	3	.73	.78	.72	.81	.68	.81	.77	.80

Table 2. Descriptive statistics (M (SD)) on classmate expectations towards high-achieving female and male students in the school subjects of natural sciences, mathematics, languages, and sports

Scale	Sciences		Mathematics		Languages		Sports Subjects	
	f.	m.	f.	m.	f.	m.	f.	m.
Intelligence	4.42 (1.16)	4.34 (1.18)	4.31 (1.24)	4.31 (1.31)	4.00 (1.22)	3.94 (1.23)	2.98 (1.10)	2.90 (1.12)
Social competence	3.47 (0.82)	3.52 (0.84)	3.55 (0.80)	3.58 (0.88)	3.78 (0.88)	3.68 (0.90)	4.13 (1.03)	4.14 (1.01)
Conscientiousness	2.96 (0.99)	2.95 (0.97)	2.83 (1.02)	2.91 (0.98)	2.67 (0.93)	2.78 (0.89)	2.28 (0.82)	2.29 (0.81)

Note: f. = high-achieving girl; m = high-achieving boy

Table 3. Main effects of repeated measurement analyses of variance for the repeated measures factor school subject

Scale	$F(2.53, 253.47)$	p	η^2
Intelligence	82.11	***	.45
Social competence	42.83	***	.30
Conscientiousness	27.27	***	.22

***: $p < .001$

Table 4. Simple Contrasts for the perceived qualities (comparison of natural science with the other school subjects)

	$\underline{F}(1, 100)$	p	η^2	$\underline{F}(1, 100)$	p	η^2	$\underline{F}(1, 100)$	p	η^2
Scale	Sciences – Mathematics			Sciences – Languages			Sciences – Sport Subjects		
Intelligence	0.90	.34	.01	18.98	***	.16	160.64	***	.62
Social competence	1.81	.18	.02	17.07	***	.15	75.78	***	.43
Conscientiousness	1.81	.18	.02	12.60	***	.11	48.36	***	.32
				Mathematics – Languages			Mathematics – Sports Subjects		
Intelligence				13.42	***	.12	126.55	***	.56
Social competence				8.40	**	.08	57.44	***	.36
Conscientiousness				4.40	*	.04	34.47	***	.25
							Languages – Sports Subjects		
Intelligence							80.36	***	.45
Social competence							57.07	***	.36
Conscientiousness							31.51	***	.24

***: $p < .001$, **: $p < .01$, *: $p < .05$

Figures

Figure 1. Expected intelligence, social competence and conscientiousness in the four school subjects