

Musical elite gymnasia as learning environments and settings for personality development in secondary students? The case of musical self-concept

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Abstract

Elite gymnasia with a main focus on musical education are special institutional learning environments for the students attending those schools: Their curricula differ considerably from those of non-specialized schools regarding the emphasis that is placed on musical activities. Thus, if effects of intensive musical education on personality development proposed in musical education research are to be found, then examining students from such elite schools seems pertinent. However, beyond institutional impact, effects of variables from the students' individual learning environment are to be expected. Thus, reanalysing data from Bernecker, Haag and Pfeiffer (2006), we investigated effects of both the institutional and the individual learning environment on different facets of the self-concept of ability with $n = 509$ students from 91 classes including class-levels 5 to 10 (corresponding to an age of 10 to 16 years). Classes were located either at musical elite gymnasia providing intensive musical education and including the opportunity to participate in an internationally recognised choir or at non-specialized gymnasia without such an elite musical profile. As expected, multilevel analyses revealed strong effects of school type (i.e., institutional effects) on musical activities. However, in line with Schellenberg (2006), our results did not provide evidence either for substantial institutional effects on the musical self-concept, or for such effects on the academic or general self-concept. Rather, variance in self-concept facets could better be explained via aspects of the individual learning environment or by personal characteristics like school grades or the intrinsic value of musical activities. The implications for potential effects of attending a musical elite gymnasium on personality development as well as avenues for further research are discussed.

Keywords: learning environment, music education, self-concept, musical activities

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The role of institutional and individual learning environments in fostering students' personality development

The present paper examines the role of both institutional and individual learning environments in the development of students' personality, focusing on their self-concept development. Regarding institutional learning environments, the pivotal question is: How important is the school environment for students' personality development? It goes without saying that the school environment is important for students' learning: According to the 'utilization of learning opportunities model' developed by Helmke (2012), learning not only depends on individual factors like the students' activities, their potential and their family background, nor is it completely determined by the teacher and his/her instruction. Rather, it is also affected by the environment or context in which learning takes place. Features of the school including its profile can be relevant for student learning and competency development. These aspects will be referred to as 'institutional learning environment' in the present paper. However, it is still an ongoing research issue whether these features are also effective determinants of students' personality development.

Learning does not only take place at school. Rather, according to sociocultural approaches to learning, which can be traced back to Vygotsky and his colleagues, the sociocultural environment also plays an important role in student learning. That is, learning takes place in the interaction with other people by means of co-constructing knowledge (John-Steiner & Mahn, 1996). This is certainly also true for the development of musical competencies, which require intensive practising outside school lessons on a regular basis. Thus, the focus on learning and development should also take into account the students' social environment (cf. Helmke, 2012). The behaviour and attitude of socialisation agents as perceived by the students, as well as their expectations regarding students' activities can be viewed as crucial components of the individual learning environment. Thus, socialisation agents do not only affect non-formal and informal learning, but also the formation of students' attitude and self-concept which may be viewed as domain-specific aspects of their personality (cf. Kröner, 2013). In the present paper, we call the social environment of the students the 'individual learning environment'.

But how does the institutional and individual learning environment impact student learning and self-concept development in the musical domain? In general, '...learning environments exert both a direct and an indirect influence on student learning, including their engagement in what is being taught, their motivation to learn, and their sense of well-being, belonging, and personal safety' (KMK, 2010). According to this view, in an effective learning environment, students' learning proceeds faster, as they are more deeply engaged in the learning process, more strongly motivated to learn and more prone to hold positive feelings towards their learning environment. However, learning environments are not only relevant for cognitive learning outcomes. Rather, effective learning environments are also supposed to foster the development of the students' personalities in general and of their self-concept in particular, which will be outlined in detail in the present paper.

Institutional learning environments focusing on musical education

Most schools intend to foster students' personality development in line with the description of their school profiles (Reynolds, 1995; Welch et al., 2004). However, they are not always successful in that task: Durlak, Weissberg, and Pachan (2010) showed in their meta-analysis on the effects of after-school programmes that these programmes often do not have positive effects on personality development. One reason for this may be that core personality variables like openness are difficult to modify via interventions. Another reason might be that typically these programmes are restricted to a few hours in the afternoon. Thus, the present paper focuses on schools that go far beyond the normal degree of sharpening the school's profile. To this end, we focus on potential effects of musical elite gymnasia which are closely associated with prestigious choirs. In Germany, there are a handful of schools connected to one of the nationally or internationally renowned boys' choirs, including the 'Regensburger Domspatzen' (Regensburg Cathedral Sparrows), the 'Dresdner Kreuzchor' (Dresden Kreuzchor), the 'Leipziger Thomanerchor' (St. Thomas Boys' Choir), the 'Windsbacher Knabenchor' (Windsbach Boys' Choir) and the 'Tölzer Knabenchor' (Tölz Boys' Choir, cf. Krippner, 2007, for a detailed discussion of these institutions). We selected these environments because they provide really 'strong treatments' in the sense of placing a strong emphasis on fostering learning and development in the musical domain. The boys attending these schools spend a large amount of their school and leisure time on musical activities. They not only engage in many musical activities as part of their curriculum, but many of them also sing in and perform with prestigious choirs connected with their schools on national and international levels. Thus, students at these schools may be expected to develop professional skills in singing and usually learn to play at least one instrument during classes.

Given the intensive musical practice at these schools, it goes without saying that these schools are effective learning environments for the acquisition of expert skills in the musical domain. Moreover, scholars involved in the cultural education discourse would assume that the intensive musical education provided by these schools should also display effects on personality development. They would even claim that these effects may not be restricted to the musical domain. Extra-musical effects of musical activities have been intensively discussed for the last two decades. Some researchers have reported very general effects on health, general well-being or cognitive abilities (Bastian, 2002; Bilhartz, Bruhn, & Olson, 1999; Menon & Levitin, 2005; Rauscher & Hinton, 2011). But those effects were either difficult to replicate (Waterhouse, 2006) or turned out not to be specific to musical activities (Vogt, 2004). However, besides the notorious Mozart effect, intensively playing an instrument can be assumed to be more closely related to variables such as self-efficacy or the self-concept of ability in the musical domain (Fritzsche, Kröner, & Pfeiffer, 2011; Kröner, Schwanzer, & Dickhäuser, 2009; Reynolds, 1995; Welch et al., 2004). Thus, it might be a promising avenue of research to investigate effects of school profiles on the musical self-concept.

Effects of institutional learning environments on the musical self-concept

In the present study, we investigated whether musical elite gymnasia as institutional learning environments are not only effective in enhancing students' musical competency, but also in fostering their personality development, at least related to the self-concept in the musical domain. This is a question without a straightforward answer. On the one hand, there are research results favouring a more positive self-concept of students attending prestigious schools. This includes several studies on the *basking in reflected glory* or *assimilation* effect which refer to the positive effect on students' self-concept resulting from the mere fact of attending a prestigious school (Marsh, Köller, & Baumert, 2001; Marsh, Kong, & Hau, 2000), but also see Trautwein, Lüdtke, Marsh, Köller, and Baumert (2006) for a result discordant with this assumption. This effect should also – and particularly – be observable for students attending a musical elite gymnasium where qualifying examinations are applied, resulting in a more positive musical self-concept among students attending such a school as compared with students attending non-specialized gymnasia. However, the basking in reflected glory effect is normally most evident immediately after the start of attending a prestigious school (Marsh et al., 2001). After attending that school for some time, the effect declines due to tougher comparison processes within classes where the students are characterised by a high skill level (*contrast effect*), which will be explained below (e.g. Marsh et al., 2001). Thus, if there are positive effects of prestigious schools on musical self-concept of students, they should be most visible in younger students.

Beyond the assimilation effect, there are also potential adverse effects on self-concept development to be expected from an elite institutional learning environment: A *contrast effect* might appear which is characterised by a negative impact of attending a more demanding school on students' self-concept. Due to social comparisons within classes, the various facets of students' self-concept do not correspond perfectly to their objective skills, but rather reflect their relative position in contrast to their classmates. As a result, students with objectively the same achievement scores may develop a more negative self-concept when the comparison group shows a higher achievement level (Marsh & Craven, 1997; Marsh et al., 2001; Preckel & Brüll, 2010; Trautwein et al., 2006). Thus, even though students attending musical elite gymnasia probably develop superior musical skills, their musical self-concept might be lower than that of students from non-specialized gymnasia. If we take into account the contrast effect, we would not expect a higher mean musical self-concept in classes from musical elite gymnasia as compared with non-specialized gymnasia.

While assimilation and contrast effects are primarily effects of comparison processes, there are also other mechanisms that may positively affect the musical self-concept of students attending musical elite gymnasia: According to selection and self-selection effects, we can assume that students who attend musical elite gymnasia already possess higher musical skills when starting attending secondary school in comparison to students attending non-specialized gymnasia. This should work together with the assimilation effect, leading to a higher self-concept among younger students.

Moreover, the self-concepts of students in musical elite gymnasias may be boosted by their perception of an increase in their musical competencies during their school time. This is a core assumption of the so-called *skill-development* perspective, which assumes that there are effects of achievement on self-concept (e.g. Calsyn & Kenny, 1977). The same is to be expected from another perspective, the so-called *reciprocal effects* perspective, which assumes that high musical skills and self-concept reinforce each other (see e.g. Guay, Marsh, & Boivin, 2003; van Aken, Helmke, & Schneider, 1997). However, the relevant comparison group of musically active students at non-specialized gymnasias will also increase their musical competencies and outperform their musically inactive classmates (a group which is not present at musical elite gymnasias), and as a consequence, increase their self-concept perhaps even more than students at musical elite gymnasias.

Taken together, it is difficult to determine whether at the end of the day students in musical elite gymnasias will benefit from their institutional learning environment not only regarding development of musical skills, but also regarding self-concept development: These developmental processes are affected by many different processes in different institutional learning environments which are difficult to disentangle. However, separating these processes via longitudinal or experimental analyses is not the focus of the present paper. Rather, facing the plethora of studies postulating the most promising results of musical education, we want to explore the net effect of musical elite gymnasias as hothouses of musical education and compare it with effects of the individual learning environment. If there were no net effects on the musical self-concept, let alone the academic or general self-concept, but a strong effect of variables at the individual learning environment, this would be evidence that could shed new light on normative statements advocating institutional musical education as a means of fostering personality development.

Transfer effects of institutional learning environments on non-musical self-concept aspects?

The hierarchical structure of the self-concept of ability (which will be outlined in the following paragraph) offers the possibility not only to examine effects of an elite musical education on the musical facet of self-concept, but also to examine transfer to other, more general facets with lower proximity to musical aspects, including the academic or the general self-concept. Thus, investigating the connection between elite musical education and various self-concept facets has the potential to empirically test an assumption that is central to the cultural education discourse: The assumption that there are effects of aesthetic education on personality development. We will illustrate how possible effects on non-musical self-concept facets may occur, starting from Shavelson, Hubner, and Stanton's (1976) model of self-concept, the work of Marsh (1990) related to this model and the contributions of Vispoel (1995).

Shavelson et al. (1976) postulated a multidimensional self-concept model with a hierarchical structure. In this model, the general self-concept is subdivided into academic,

social, emotional and physical facets. These facets of the self-concept can again be subdivided into more specific aspects. According to the model, the academic self-concept can be separated into diverse domains like mathematics or verbal abilities. While the hierarchical representation turned out to be more complex than originally assumed, this strand of research actually resulted in multidimensional questionnaires with scales for several domains (Marsh, 1990). Recently, Vispoel (1995) extended the range of available domain-specific self-concept scales by constructing a scale for an artistic self-concept, including the musical self-concept.

Concerning the stability of the different aspects of self-concept, the aspects of a higher hierarchical level are supposed to be more stable than the more specific facets of the self-concept, that is the more specific, the more amenable to change the facets of self-concept are. Higher-level self-concept factors should begin changing as a result of changes in one or more specific facets. Thus, a more positive musical self-concept might in turn enhance more general self-concept aspects like the academic self-concept or the general self-concept, such that, given an effect of learning environments on musical self-concept, at least moderately positive changes in the more general self-concept facets are conceivable (Vispoel, 1995). Note, that if there are institutional environments in which changes in the musical self-concept should influence the academic self-concept, musical elite gymnasia should be among them, which focus on musical education and where musical activities are an obligatory and serious part of the curriculum.

The role of the individual learning environment for the (musical) self-concept

Institutional settings related to the mesosystem according to Bronfenbrenner (1981) may be important for fostering personal development, however they are not the only force involved in this process. Rather, the individual microsystem plays an important role as well. Socialisation agents are not only important for the acquisition of musical skills, but may also affect students' personality and self-concept. Regarding the family and especially the parents, their parenting style is supposed to influence children's personality and self-concept (Steinberg, Elmen, & Mounds, 1989). This refers to the self-concept in general, but should also apply to the musical facet of self-concept. Furthermore, the various facets of self-concept derive from comparisons and communications with socialisation agents like peers, classmates, or siblings. It should make a difference for ability self-concept if the parents are proud of the child's musical activities or not, if the peers value these activities, and also how often musical activities are performed within the family or the peer-group.

To our knowledge, effects of the individual learning environment in the musical domain have not been a topic of many studies yet. However, given the literature on other domains cited above, we expect that the family (the parents) and the peers are important for the development of students' musical activities and their (musical) self-concept (Fritzsche et al., 2011).

The role of institutional and individual learning environments for musical activities

For institutional and individual learning environments to affect personality development, they first have to exert a positive effect on the level of musical activities. These effects are the topic of the present section.

Effects of institutional learning environment on musical activities: To develop higher musical skills, it is necessary to practice on a regular basis and to spend time and energy playing music (Ericsson, Krampe, & Tesch-Römer, 1993). In musical elite gymnasia, students have multiple opportunities and obligations to engage in such activities. Participation in prestigious choirs goes along with many hours of practising and a significant number of performances (Krippner, 2007). Thus, this kind of environment can be expected to go together with musical activities of great extent.

Effects of individual learning environments on musical activities: As already outlined in the introduction, institutional learning environments may be important, but they are not everything. Rather, the students' individual learning environment is also an important aspect to be considered when investigating effective learning environments (Taylor, 2011). Musical activities are heavily influenced by socialisation agents including family members, or peers, especially as members of music groups (Taylor, 2011). The theory of planned behaviour is a well-established theoretical approach for comprehensively investigating individual determinants of behaviour in various domains. According to that theory, the subjective norm, i.e. what socialisation agents think about a certain behaviour, is a variable to be considered when investigating determinants of behaviour (Ajzen, 1991; Kröner, 2013). The theory has previously been successfully applied to the musical domain (Fritzsche et al., 2011; Kröner et al., 2009). Amongst others, this resulted in evidence that perceptions regarding behaviour of parents and peers as well as regarding their expectations are important variables when it comes to explaining variance in musical activities. Thus, even for students attending prestigious schools with musical profiles, we expect them to display more musical activities if their parents or peers are also musically active and if they take an interest in their musical activities.

Controlling for person characteristics: We also included personal characteristics to put the variables of institutional and individual learning environments mentioned above to an even stronger test. Thus it becomes feasible to test if the variables of the institutional and the individual learning environment still explain variance when personal characteristics like intrinsic value or individual grades are taken into account. Moreover, it is interesting whether effects of institutional and individual variables on the musical activities remain significant if the musical self-concept is controlled for, and vice versa. The following research questions summarise the aims of the present study.

Research questions and hypotheses

The research questions in the present study focus on effects of institutional learning environments as provided by musical elite gymnasia in comparison with non-specialized

gymnasia on different aspects of the self-concept. Moreover, they aim at effects on self-concept due to the individual learning environment comprising the parents and the peers. As a manipulation check, we also investigated effects of musical elite gymnasia on musical activities and we also controlled for personal characteristics. Our research questions were as follows:

(1) Are there any differences between classes regarding the musical, the academic and the general self-concept?

As our sample of schools is quite heterogeneous and students probably experience very different institutional learning environments, we expect that there are substantial differences between classes regarding the musical self-concept. According to the effects of musical activities on personality development conjectured in the cultural educational discourse, the academic self-concept and the general self-concept may also be different between the classes – albeit to a lesser degree than the musical self-concept.

(2) Does the institutional learning environment at musical elite gymnasia explain variance in the musical, the academic and the general self-concept?

We expect that the intensive musical education at musical elite gymnasia explains a substantial amount of variance in the musical self-concept. Moreover, a more positive musical self-concept may also go along with a more positive academic and general self-concept.

(3) If the institutional learning environment does explain variance in musical activities and the self-concept facets, do indicators of the individual learning environment explain variance above and beyond the effects of the institutional learning environment? And do the effects of the institutional environment still remain significant after adding individual variables?

We expect that indicators from the individual learning environment explain considerable variance above and beyond variables from the institutional environment. Moreover, it is possible that variables from the institutional environment are outweighed by variables from the individual learning environment. This remains to be explored.

(4) Are effects of the institutional and the individual learning environment still significant when controlling for personal characteristics such as grades and intrinsic value?

We do not have any specific hypotheses related to this research question. Rather, due to the important role of personal characteristics in studies building on the theory of planned behaviour, among others, we decided to explore effects of some personal variables that were relevant in previous studies on musical activities.

As a prerequisite to an investigation of the research questions stated above, we started by examining whether there were any differences between classes regarding musical activities. We expect students in musical elite gymnasia to spend more time on musical activities than students from non-specialized gymnasia. This was a check to examine whether we succeeded in selecting students from an intensive musical learning environment compared to students from non-specialized gymnasia.

Method

Sample

To answer our research questions, we analysed a subset from the sample of the study by Bernecker et al. (2006). As only boys have the opportunity to sing in the famous choirs mentioned above, the girls from the non-specialized gymnasias were excluded from the final sample. As we intended to compare being musically active in different learning environments rather than being musically active vs. inactive, we decided to also exclude musically inactive students (i.e., not playing any instrument or not singing in a choir) from the subsample of non-specialized gymnasias. Thus, our subset consisted of students from three out of five gymnasias in Germany that host students from the most renowned German elite choirs ('musical elite gymnasias') and students from non-specialized gymnasias. Altogether, the sample consisted of $n = 509$ musically active male students from 91 classes from class-levels (grades) 5 to 10. Mean age of students was $M = 13.51$ ($SD = 1.75$). There were $n = 178$ students from non-specialized gymnasias and $n = 331$ students from musical elite gymnasias.

Instruments

As the present study is a reanalysis of the data from Bernecker et al. (2006), we were limited to the scales available in their questionnaire. On the individual level, a scale regarding the extent of *musical activities* was available. To operationalise this variable, students were asked about the length of weekly music lessons, the mean time they practice at home, the length of weekly ensemble practice and the frequency of performing with their band or choir. As these variables had been assessed with different response formats, all variables were z-standardised before the computation of this scale. Internal consistency was satisfactory with $\alpha = .66$ (four items).

Furthermore, the questionnaire covered scales regarding different facets of the self-concept at the individual level, i.e., the general self-concept, the academic self-concept and the musical self-concept. The different facets of self-concept were assessed with items adapted from Schwanzer (2002), which are based on the SDQ III developed by Marsh and O'Neil (1984). The *general self-concept* covers the general impression students have about themselves and is assessed with items like 'I have many positive characteristics. [Ich habe viele gute Eigenschaften.]'. In the present study, the scale contained six items and reliability was satisfactory with $\alpha = .77$. The *academic self-concept* concerns students' subjective evaluation of their academic achievements and is more specific than the general self-concept. It is assessed with items like 'Overall, I do well in school. [Insgesamt bin ich in der Schule gut.]'. In the present study, the scale contained four items ($\alpha = .85$). The *musical self-concept* relates to students' subjective evaluation of their musical skills and is assessed with items like 'Concerning musical abilities, I am very gifted [Ich bin musikalisch sehr begabt.]'. In the present study the scale contained five items and internal consistency was fair ($\alpha = .81$). For all self-concept facets, students had to choose one of four response alternatives from strong disagreement to strong agreement.

As an indicator of the institutional learning environment, we included academic track (coded as 1 = 'attending a musical elite gymnasium', 0 = 'attending a non-specialized gymnasium') as a dummy variable on the group-level. Furthermore, we included a dummy variable concerning the class-level of the students as a control variable on the group-level (coded as 1 = 'attending class-level 5, 6 or 7', 0 = 'attending class-level 8, 9 or 10').

To account for significant people within the individual learning environment, we included students' answers to single items addressing their parents' attitude toward their musical activities ('My parents are interested in my musical activities. [Meine Eltern interessieren sich für meine musikalischen Tätigkeiten.]', four response alternatives from strong disagreement to strong agreement) and whether their peers are interested ('Are your friends interested in your musical activities? [Interessieren sich deine Freunde für deine musikalischen Aktivitäten?]', three response options from 'all' to 'none').

As the self-concept of ability is related to academic achievement, grades in music, mathematics and the students' first language German were assessed in the questionnaire and included in our analyses as personal characteristics. When interpreting results, it should be noted that it is common practice in Germany to code grades from 1 (very good) to 6 (insufficient), such that lower grades indicate higher achievement. This usually leads to – at first sight unexpected – negative correlations between grades and e.g., self-concept. Additionally, the *intrinsic value* of playing an instrument or singing was included in our analyses as a personal characteristic. It was assessed with items like 'I am happy, when I can play music [Ich freue mich, wenn ich Musik machen kann.]'. The scale in the questionnaire comprised five items ($\alpha = .83$) with the same response format as that of the self-concept facets.

Moreover, for the model with musical activities as criterion, the musical self-concept was included as a personal characteristic. Vice versa the musical activities were included as a personal characteristic in the models with the different self-concept facets as criteria. Students filled out the questionnaires during regular lesson time. Assessments were administered by the respective teachers.

Analyses

When focusing on learning environments in research on learning and instruction, variables at the group level are usually taken into account via multilevel approaches (Peugh, 2010). This offers the advantage of simultaneously estimating effects of both individual variables and variables at the group level without underestimating measurement errors. We analysed the data with R (R Development Core Team, 2012). To take the multilevel structure of the sample into account, we applied the package multilevel (Bliese, 2013). Firstly, we inspected intraclass correlations and the respective design effects for each of the criterion variables. Secondly, we ran a series of multilevel models. Starting with the null models, we then added the variables from the institutional learning environment (dummy variables indicating the type of school and the class-level of the students), followed by variables from the individual learning environment (perceived interest and expectations of parents and peers) and continued with personal characteristics at the individual level (grades, intrinsic value and either musical activities or musical self-

concept depending on the criterion). Including students' mean age as an additional variable at the group level did not result in any unique explained variance in the final models, thus we decided to skip it in the analyses. We computed separate models for the following criteria: musical self-concept, academic self-concept and general self-concept. Additionally, we computed models with musical activities as criterion as a manipulation check if students enjoying the intensive musical education at musical elite gymnasias show extensive musical activities.

Results

Before reporting results from multilevel modelling, we first report the descriptive statistics and the bivariate correlations.

Descriptive statistics and bivariate correlations

The mean values, standard deviations and bivariate correlations of the variables are presented in Table 1. Students reported quite positive values for all self-concept facets and all facets were statistically significantly correlated with each other. Regarding bivariate correlations with musical activities, only the musical self-concept displayed statistically significant correlations with musical activities, whereas the academic and the general self-concept showed no substantial relationship with musical activities.

Table 1:
Descriptive Statistics and Bivariate Correlations of the Criteria and the Predictor Variables

	<i>M (SD)</i>	Range	Musical activities	General self-concept	Academic self-concept	Musical self-concept
Musical activities	0.00 (0.70)*			.07	.06	.29
General self-concept	3.21 (0.45)	1 - 4			.51	.28
Academic self-concept	2.95 (0.59)	1 - 4				.32
Musical self-concept	3.13 (0.59)	1 - 4				
Grade in German ^a	2.80 (0.81)	1 - 6	-.24	-.15	-.41	-.24
Grade in math ^a	2.84 (1.00)	1 - 6	-.06	-.19	-.46	-.08
Grade in music ^a	2.05 (0.89)	1 - 6	-.11	-.19	-.35	-.38
Intrinsic value	2.93 (0.65)	1 - 4	.27	.23	.20	.56
Interest of parents	Mode = 'strong agreement'	4 options	.30	.23	.15	.39
Interest of peers ^b	Mode = 'some'	3 options	-.29	-.11	-.13	-.22

Notes. All correlations whose absolute value higher than .10 are statistically significant at $p < .05$ (set in bold); * all single items were z-standardised; ^a in Germany, grades are coded from 1 (very good) to 6 (insufficient); ^b inversely coded.

Regarding correlations of our criteria with the predictor variables, there were statistically significant correlations of the criteria with school grades in German and music, whereas the grades in math were only correlated with the academic and the general self-concept. Moreover, all criteria were correlated with the intrinsic value of playing music, the parents' interest in their children's musical activities and the interest of the students' peers in their musical activities. The relationship between the musical self-concept and the intrinsic value of musical activities was especially close. To investigate effects of the institutional learning environment and the individual learning environment in comparison to personal characteristics, we ran several multilevel models for all the respective criteria under investigation.

Multilevel analyses

In the first step, we investigated intraclass correlations (ICCs) and respective design effects of all criterion variables to gain a first glimpse into differences between the classes in our sample (cf. Table 2). As expected, there was a very high ICC for musical activities which provided a basis for exploring effects of the institutional learning environment in multilevel analyses. ICCs for the self-concept facets were rather small in comparison, but we nevertheless ran multilevel analyses to explore how the variance within classes can be resolved.

In the next step, we sought to gain further insights into the respective effects of the institutional learning environments (as compared with individual learning environments and while controlling for personal characteristics) on musical activities and the self-concept facets. Therefore, we first included the predictor variables from the institutional learning environment (type of school and lower vs. higher class-level) into the null models. As a second step, we included the variables from the individual learning environment (interest of parents and peers). As a third step, we ran models with additionally added personal characteristics on musical activities and self-concept facets, respectively. In all these models, we included grades and intrinsic value. Moreover, depending on the criterion, we included either musical activities as a predictor (in the models with the self-concept facets as criteria) or the musical self-concept as a predictor (in the model with musical activities as criterion). Results of our multilevel analyses are presented in Tables 3a to 3d.

Table 2:
Intraclass Correlations (ICCs) of the Main Variables of Interest

Variable	ρ / design effect*
Musical activities	.43 / 11.32
Musical self-concept	.09 / 3.16
Academic self-concept	.04 / 1.96
General self-concept	.03 / 1.72

Note. * computed with expected class size of $n = 25$.

Musical activities: Our results showed that the variables from the institutional learning environment (type of school and class-level) explained 48 % of the between-class variance and 0 % of the within-class variance in the musical activities. Thus, almost half of the large amount of variance regarding the musical activities between classes could be explained by the type of school attended (class-level did not explain any variance). Additionally, including the variables from the individual learning environment (interest of

Table 3a:

Results of Hierarchical Linear Models with **Musical Activities** as Criterion and Institutional and Individual Variables as well as Personal Characteristics as Predictors (unstandardised)

Criterion:	Model 1	Model 2	Model 3	Model 4
Musical Activities (based on standardised items)	(Unconditional model)	(Variables from institutional env. added)	(Variables from individual env. added)	(Personal characteristics added)
Fixed effects	Coeff. (<i>SE</i>) t-ratio			
Intercept	<i>-0.13 (0.06)</i> -2.34	<i>-0.34 (0.09)</i> -3.81	<i>-0.53 (0.17)</i> -3.10	<i>-0.99 (0.29)</i> -3.44
Type of school		<i>0.62 (0.09)</i> 6.81	<i>0.59 (0.08)</i> 7.01	<i>0.57 (0.08)</i> 7.14
Class-level (5 to 7 vs. 8 to 10)		<i>-0.14 (0.09)</i> -1.51	<i>-0.13 (0.09)</i> -1.49	<i>-0.11 (0.08)</i> -1.34
Interest of parents			<i>0.16 (0.03)</i> 4.65	<i>0.08 (0.04)</i> 2.36
Interest of peers			<i>-0.16 (0.04)</i> -4.42	<i>-0.11 (0.04)</i> -3.04
Grade in music/ German/ mathematics				<i>0.02 (0.03)</i> 0.47/ <i>-0.09 (0.03)</i> -2.62/ <i>0.02 (0.03)</i> 0.88
Musical self- concept				<i>0.21 (0.07)</i> 2.97
Intrinsic value				<i>0.02 (0.05)</i> 0.54
Random effects	Variance			
Within level	0.27	0.27	0.25	0.21
Between level	0.21	0.11	0.09	1.30
Musical self- concept	--	--	--	0.13

Note. Statistically significant coefficients are set in italics;

parents and peers) explained a further 7 % of variance on the within-level and 18 % on the between-level, while both these variables in this step showed unique effects. In the third step, personal characteristics (grades, musical self-concept and intrinsic value) were added and could explain a further 16 % of variance within classes, but no variance between classes. This was due to statistically significant effects of the musical self-concept and the grade in German, whereas there were no unique effects of the grades in music

Table 3b:

Results of Hierarchical Linear Models with **Musical Self-Concept** as Criterion and Institutional and Individual Variables as well as Personal Characteristics as Predictors (unstandardised)

Criterion: Musical self- concept (unstandardised)	Model 1 (Unconditional model)	Model 2 (Variables from institutional env. added)	Model 3 (Variables from individual env. added)	Model 4 (Personal characteristics added)
Fixed effects	Coeff. (SE) t-ratio			
Intercept	<i>3.12 (0.03) 93.45</i>	<i>3.07 (0.07) 44.01</i>	<i>2.47 (0.15) 16.03</i>	<i>2.10 (0.20) 10.27</i>
Type of school		-0.00 (0.07) -0.02	-0.07 (0.06) -1.23	<i>-0.11 (0.05) -2.09</i>
Class-level (5 to 7 vs. 8 to 10)		0.07 (0.07) 0.97	0.05 (0.06) 0.82	-0.02 (0.05) -0.31
Interest of parents			<i>0.27 (0.03) 8.17</i>	<i>0.11 (0.03) 3.87</i>
Interest of peers			<i>-0.11 (0.04) -3.17</i>	-0.01 (0.03) -0.25
Grade in music / German / mathematics				<i>-0.16 (0.03) -5.27/</i> <i>-0.05 (0.03) -1.69/</i> <i>0.04 (0.02) 2.01</i>
Musical activities				<i>0.13 (0.04) 3.60</i>
Intrinsic value				<i>0.37 (0.04) 8.39</i>
Random effects	Variance			
Within level	0.31	0.31	0.26	0.15
Between level	0.03	0.03	0.02	0.50
Grade in music	--	--	--	0.01
Intrinsic value	--	--	--	0.05

Note. Statistically significant coefficients are set in italics.

and math and the intrinsic value of musical activities. Furthermore, the model using musical self-concept as a random effect fitted the data better than the model with fixed effects only. All other variables were fixed on the basis of model comparisons. Thus, the manipulation check succeeded, showing that students from musical elite gymnasia report much more musical activities.

Self-concept facets: Among the results for the models with the self-concept facets as criteria, the most striking result was that the variables from the institutional learning environment rarely explained any variance in all three models. For the general self-concept, class-level turned out to be statistically significant in Model 2, but was no long-

Table 3c:
Results of Hierarchical Linear Models with **Academic Self-Concept** as Criterion and Institutional and Individual Variables as well as Personal Characteristics as Predictors (unstandardised)

Criterion:	Model 1	Model 2	Model 3	Model 4
Academic Self-Concept (unstandardised)	(Unconditional model)	(Variables from institutional env. added)	(Variables from individual env. added)	(Personal characteristics added)
Fixed effects	Coeff. (SE) t-ratio			
Intercept	<i>2.95 (0.03) 97.80</i>	<i>2.85 (0.06) 44.46</i>	<i>2.76 (0.17) 16.18</i>	<i>3.96 (0.21) 19.03</i>
Type of school		0.04 (0.06) 0.70	0.01 (0.06) 0.22	0.01 (0.05) 0.20
Class-level (5 to 7 vs. 8 to 10)		0.11 (0.06) 1.81	0.11 (0.06) 1.82	0.04 (0.05) 0.80
Interest of parents			<i>0.09 (0.04) 2.49</i>	0.06 (0.03) 1.64
Interest of peers			<i>-0.09 (0.04) -2.41</i>	-0.06 (0.03) -1.81
Grade in music / German / mathematics				<i>-0.09 (0.03) -3.08/</i> <i>-0.20 (0.03) -6.25/</i> <i>-0.18 (0.03) -7.10</i>
Musical activities				<i>-0.08 (0.04) -2.08</i>
Intrinsic value				0.05 (0.04) 1.29
Random effects	Variance			
Within level	0.34	0.34	0.33	0.24
Between level	0.01	0.01	0.01	0.00

Note. Statistically significant coefficients are set in italics.

er significant when adding variables from the individual learning environment. For the musical self-concept, type of school only became statistically significant in the final model and attending a prestigious school even had a negative effect. This is to be discussed later, however, note that as ICCs in the self-concept facets were generally rather small, effects within classes on musical self-concept are more interesting than effects of variables at the group-level.

Generally, in the models with the self-concept facets, the variables from the individual learning environment and the personal characteristics turned out to be more promising than the variables at the group-level in terms of the amount of explained variance.

Table 3d:

Results of Hierarchical Linear Models with **General Self-Concept** as Criterion and Institutional and Individual Variables as well as Personal Characteristics as Predictors (unstandardised)

Criterion: General Self- Concept (unstandardised)	Model 1 (Unconditional model)	Model 2 (Variables from institutional env. added)	Model 3 (Variables from individual env. added)	Model 4 (Personal characteristics added)
Fixed effects	Coeff. (<i>SE</i>) t-ratio			
Intercept	<i>3.21 (0.02) 144.51</i>	<i>3.15 (0.05) 67.08</i>	<i>2.85 (0.15) 19.34</i>	<i>2.99 (0.19) 15.91</i>
Type of school		<i>-0.03 (0.04) -0.59</i>	<i>-0.08 (0.04) -1.90</i>	<i>-0.07 (0.05) -1.55</i>
Class-level (5 to 7 vs. 8 to 10)		<i>0.11 (0.04) 2.39</i>	<i>0.08 (0.05) 1.85</i>	<i>0.04 (0.04) 0.80</i>
Interest of parents			<i>0.14 (0.04) 3.96</i>	<i>0.11 (0.04) 3.10</i>
Interest of peers			<i>-0.06 (0.03) -1.97</i>	<i>-0.04 (0.03) -1.49</i>
Grade in music / German / mathematics				<i>-0.03 (0.02) -1.30/ 0.02 (0.03) -0.91/ -0.06 (0.02) -2.62</i>
Musical activities				<i>-0.02 (0.03) -0.58</i>
Intrinsic value				<i>0.09 (0.03) 2.72</i>
Random effects	Variance			
Within level	0.20	0.20	0.16	0.16
Between level	0.01	0.004	0.37	0.25
Interest of parents	--	--	0.03	0.02

Note. Statistically significant coefficients are set in italics.

For *musical self-concept*, the variables from the individual learning environment (interest of peers and parents) additionally explained 16 % of within-variance and 33 % of between-variance. In the third step, the grades in music and mathematics, the musical activities and the intrinsic value were substantial predictors which further explained 42 % of the variance within classes, but no variance between classes compared to the preceding model (Model 3).

For *academic self-concept*, indicators for the individual learning environment (interest of parents and peers) could explain only 3 % of the within-class variance. Furthermore, these variables did not remain significant when the personal characteristics were added to the model. From the personal characteristics, the grades in music, German and math and the musical activities were substantial predictors. The intrinsic value did not turn out to be statistically significant. In comparison to Model 3, 27 % within classes and almost the complete variance between classes still unexplained in Model 3 could be explained in Model 4.

For *general self-concept*, both variables from the individual learning environment, i.e. the interest of peers and parents, could explain further variance. In Model 3, the interest of the parents was included as a random effect, as this model had a better model fit than the one with fixed effects only. Important predictors in the final model (additionally including personal characteristics) were the grade in math and the intrinsic value of musical activities, whereas the variables type of school, class-level, grades in music and German, the musical activities and the interest of the peers showed no unique effects. These predictor variables explained no further within-classes variance but 32 % of the between-classes variance which was unexplained in the preceding model (Model 3).

Discussion

The main objective of this study was to investigate whether there are effects of both institutional and individual learning environments related to intensive musical education on musical self-concept as a personality variable. Moreover, effects of institutional and individual learning environments on this variable were contrasted with personal characteristics of the students in our sample and potential effects of all these variables on more general self-concept facets were explored. To reach our goal, we used the musical self-concept, as well as the broader self-concept measures of academic and general self-concept. Furthermore, we investigated effects of the learning environments under scrutiny on musical activities as a check for relevance of these environments as well.

As in the analyses by Fritzsche et al. (2011), the musical profile of the schools turned out to be highly relevant for the extent of musical activities, as indicated by a considerable ICC that was to a large degree due to whether the students attended a musical elite gymnasium or a non-specialized gymnasium. Moreover, as to be expected, variables at the individual level like the parents' and the peers' interest as well as the musical self-concept and grades in German also turned out to be useful in explaining variance in musical activities.

Given the large effects of the institutional learning environment on musical activities, its lacking or at best small net effects on self-concept facets are remarkable. In line with Schellenberg (2006), our results neither provided evidence for broad effects of the institutional learning environment on the academic and the general self-concept nor for substantial effects on the musical self-concept. This was most probably not an effect of the rather sparse amount of variables on class-level in our study, as the ICCs for the more general self-concept facets turned out to be uniformly small and even the ICC for musical self-concept was not overwhelmingly large. Obviously, even in our sample where all musically inactive students were excluded prior to the analyses, it was the individual learning environment that turned out to be important: Variance in indicators like parents' and peers' interest in musical activities as well as the personal characteristics applied in our study turned out to be crucial for explaining individual differences in self-concept while, on the whole, the macro-level of the institutional environment provided by the school attended turned out to be irrelevant.

(Virtually no) effects of the institutional learning environment

Our results emphasised the differential significance of various aspects of the institutional learning environment for musical activities. Musical activities performed on a regular basis are undoubtedly a necessary condition for the acquisition of expert skills (see Ericsson et al., 1993). Hence, musical elite gymnasias are successful in supporting their students to develop the practicing habits required to acquire expert skills. Nevertheless, it must be considered that indicators of the individual learning environment as well as personal characteristics like the musical self-concept are important for students' musical activities, too. Thus, it is necessary to keep this kind of variable in mind for future studies examining the role of institutional learning environments in the musical domain.

Furthermore, we could observe only minor differences between classes regarding the musical self-concept. Thus, contrary to the notion of the cultural education discourse, between-class differences in musical self-concepts seem to be almost unrelated to the students' institutional learning environment as determined by the type of school. Actually, in the final model with musical self-concept as criterion, when controlling for variables from the individual learning environment as well as personal characteristics, we even detected a slight negative effect of the school type, indicating that attending a musical elite gymnasium might even be associated with a lower musical self-concept. If this effect can be replicated in further studies, it might be explained by a stronger contrast effect in comparison to the assimilation effect. An alternative explanation might be that musical skills are more important for academic success in musical elite gymnasias, leading to a more critical self-assessment of musical competencies among students attending musical elite gymnasias as compared with students attending non-specialized gymnasias. However, even if negative effects on self-concept might not be replicable, note that pivotal to our research questions is the finding that there are no noteworthy positive effects on musical self-concept of even some of the most intensive musical learning environments available in Germany. This is a remarkable result that questions the rather enthusiastic claims of fostering personality development via institutional learning environments

in the musical domain in a large part of the extant literature. Thus, it is an interesting question for further studies to investigate which interplay of various mechanisms lead to this net result.

The missing ICC of general self-concept is a striking effect, as more intensive musical interventions than those connected to the school profiles under scrutiny are difficult to imagine, and selection effects should even enhance these effects. If even in our sample no effects of the institutional environment on general self-concept are visible, one might wonder how else such extra-musical effects on general self-concept could be found. This is perhaps the main lesson from our study: As one would also be totally content with effects of science, technology, engineering and mathematics education on related self-concept facets, one should perhaps be equally modest with expectations regarding effects of aesthetic education on self-concept facets other than aesthetic ones. And for the intra-musical domain, our results showed that the institutional learning environments observed in our study seem to have done their job in terms of making students rehearse. Thus, even without having measured students' competencies in the musical domain, we are confident that musical elite gymnasia are the right decision for students wishing to gain expert skills in the domain of music.

Effects of the individual learning environment

Besides effects of the institutional learning environment, we also investigated effects of the individual learning environment on self-concept facets. In all models, variables from the individual learning environment, i.e., the parents' and peers' interest in students' musical activities, could explain further variance both within and between classes.

For all self-concept facets, the interest of the parents had a substantial positive effect in the direction expected (the negative effect of the peers' interest was due to the inverse coding of the scale on peers' interest). The positive effect of parents' interest was in line with our expectations: Those who are perceived as valuing their children's musical activities and as being proud of their children's musical skills enhance their children's feelings about their musical activities and thus influence the development of a more positive self-concept. Along the same lines, students with a high musical self-concept, which is associated with a high level of musical activities, tend to affiliate with peers who are interested in music and who are musically active themselves.

Beyond testing effects on self-concept facets, we also explored effects of variables from the individual learning environment on musical activities as criterion. As expected, in line with the theory of planned behaviour, these individual variables explained additional variance: The higher the interest of parents and peers, the more musical activities were reported from the students, even when the institutional environment was taken into account in the same model.

Effects of personal characteristics

After taking effects of institutional and individual learning environments into account, we also added personal characteristics like grades, intrinsic value and musical activities and self-concept, respectively. For all criteria including musical activities, a substantial additional amount of variance was explained by these personal characteristics. Regarding effects of institutional and individual learning environments, it can be stated that these were by and large unaffected by the inclusion of personal characteristics.

Implications for musical education at schools as an institutional learning environment

As outlined in the theoretical background, we were sceptical regarding effects of the institutional learning environment on musical self-concept let alone effects on facets of the self-concept which are not linked that closely to the domain of music. In fact, there were neither large self-concept differences between classes, especially in the general and academic domain as shown in the ICCs, nor was it possible to detect substantial positive effects of attending prestigious institutions providing extensive musical education on self-concept. To the contrary, as already mentioned, the only effect of type of school on a self-concept variable was a small effect on the musical self-concept – and it was negative.

The small self-concept ICCs and the missing positive effects of the institutional learning environment on self-concept facets fit nicely with the literature on social comparison processes underlying self-concept statements. In line with the *big fish little pond* literature, the musical self-concept of students attending musical elite gymnasias is probably a net effect of both a strong contrast effect of the subjective assessment of the standing within a class and a weak assimilation effect of being part of a prestigious group.

Note that the small negative effect of attending a musical elite gymnasium on musical self-concept does not rule out that there are indeed some positive effects of an intensive musical education on musical self-concept. Maybe these effects exist. If they are the main goal of musical education, they may better be reached by a non-specialized musical education in everyday settings outside musical elite schools, keeping the students within their everyday reference group in which not everyone specialises in the musical domain. This might have a beneficial effect of being a big fish in the vicinity of their musical illiterate classmates while not being in direct comparison with semi-professional musicians who subject them to negative social comparison all day long. However, this might sacrifice the opportunity to optimally foster the development of musical competencies given by the institutional learning environments that were included in our study. Obviously, the goal of self-concept development and skill development are not easy to fulfil simultaneously.

Limitations and implications for further research

No competency assessment regarding musical skills as personal characteristic: As already stated in the method-section, we chose the dataset from Bernecker et al. (2006) for our analyses. This dataset is probably unique in including students from three of the most renowned German musical elite gymnasia. Unfortunately, this dataset also has some weaknesses in the operationalisation of constructs that are relevant for our research questions. Most of all, it would be a very interesting avenue for further research to include measures for objectively assessing musical skills, as the grades in music available in our dataset might be suitable to assess differences in musical skills within classes, but are probably not suitable for comparisons between classes due to the teachers' biases. To shed further light on the generation of musical self-concept in musical elite gymnasia, tests of musical skills should be included in further studies. However, in the light of the obvious excellence of the choirs for the musical elite gymnasia, substantial differences in achievement levels concerning musical skills between students from non-specialized gymnasia and students attending musical elite gymnasia can be taken for granted. Thus, it is improbable that the rather small differences in musical self-concept between classes can be traced back to inefficiency of the schools' learning environment in fostering competency development.

More fine-grained assessment of the institutional learning environment: For the same reasons as with competency assessments, we could not take into account a broad range of indicators describing the institutional learning environment at the different gymnasia. It would be interesting to include more variables of that type in future studies, e.g., applying teacher questionnaires or videotaping music lessons. Moreover, it would be a good idea to include variables like the school's facilities regarding musical activities, e.g., special music rooms or the availability of instruments which can be borrowed by students who cannot afford their own instruments. Such variables might be suitable to uncover relevant differences among the elite gymnasia included in our study which might have concealed differences in our criterion variables. For example, there might be differences in the quality of musical education for students that do not take part in the selection choirs for which the gymnasia are famous. Also, for group level variables such as teachers' own musical education as well as their style of classroom teaching, it would be interesting to test their explanatory value for the large effects of school type on musical activities.

Potential effects of elite gymnasia on personality variables not applied in our study: Beyond adding more predictor variables, another interesting perspective would be to include additional criterion variables. For example, one could think of investigating effects of the institutional learning environment on conscientiousness or self-regulated learning skills. It would be premature to claim that musical elite gymnasia do not have any effects on personality development before a broad range of variables has been tested. Nevertheless, the present study provides evidence that at least effects on self-concept development are not as strong as to be expected from the extant literature.

Self-concept development after leaving musical elite gymnasia: It is dangerous to claim causal effects of the institutional learning environment when not applying an experi-

mental design. We relied on the different school profiles in the sample, but it was not possible to assign students randomly to the two different school types (musical elite gymnasia vs. non-specialized gymnasia). Therefore, it is important to consider a potential selection bias when the students in the sample chose their secondary educational track. The students attending musical elite gymnasia have to pass qualifying examinations before being allowed to attend those elite schools. Thus, they might already have been more musically active, competent and self-confident than the students from the non-specialized gymnasia before they attended the respective schools (selection effects). This would have two implications: First, that the effect of the institutional learning environment on musical activities might be overestimated in the present study. Second, given the fact that there is no effect of attending a musical elite gymnasium on explaining the ICC of the musical self-concept, this would imply that attending a musical elite gymnasium would in fact *lower* musical self-concept via the big fish little pond effect, at least as long as students are part of this elite environment. Thus, a very exciting research question for future research in relation to expected underlying social comparison processes – which are supposed to hamper differences in self-concepts comparing classes – would be how the musical self-concept of students coming from schools with distinct musical profiles and students coming from non-specialized gymnasia develops after leaving school and thus leaving the group which was the framework for social comparisons. This should be investigated in further studies.

Interrelation of self-concept aspects: Regarding the low ICCs of the general and the academic self-concept, it was no surprise that the institutional learning environment has no impact on resolving any variance in these variables. However, this result does not rule out that there may be effects of the institutional learning environment on the dimensionality of the self-concept or the centrality of specific self-concept aspects for more general self-concept facets: Recently, studies from the science domain have been published, where it could be shown that the teaching mode has effects on the relationship between different self-concept facets (Jansen, Schroeders, & Lüdtke, 2014; Jansen, Schroeders, Lüdtke, & Pant, 2014). Thus, students attending musical elite gymnasia as compared with students attending non-specialized gymnasia might judge their musical self-concept to be more important to their academic self-concept (stronger relationship between musical self-concept and academic self-concept). This is also an issue for further research.

Importance of the individual learning environment: Our results underline the importance of the individual environment for the self-concept (development). The next step aiming at adding to our knowledge of the importance of the individual learning environment would be to include a more thorough operationalisation of the individual learning environment than that used by Bernecker et al. (2006), e.g. on the basis of the theory of planned behaviour. Above and beyond, the parents' perspective could be included not only to validate students' self-reports, but also to investigate effects of musical habits in the families like singing together or playing music together. Afterwards, it would be interesting to investigate the interplay of the individual and the institutional learning environment to shed light on questions like: Does the individual learning environment influence the selection of a certain school?

Generalisation to girls, further domains and lower educational tracks: Regarding our sample, we excluded all girls from the final sample, as there are no German musical elite gymnasia for girls. To widen the scope of our results, further studies should also include girls. Lacking musical elite gymnasia for girls similar to the ones included in this study, a further possibility would be to widen the scope from music to other domains like sports, where elite gymnasia admit girls, too. Also, we excluded the students not playing any instruments from our analyses. This was straightforward as our interest was not in effects of musical activities per se, but rather on the institutional learning environment provided by musical elite gymnasia. However, further studies may also readdress the issue of effects of musical activities specifically. Moreover, in the present study, just students from the highest educational track were part of the sample and it might be that via restriction of range, this concealed an effect of musical activities on the musical self-concept for students from lower educational tracks, whose achievements in school are lower than those of students from higher educational tracks, thus creating a need for alternative fields of comparison.

Conclusion

In summary, our results show that musical elite gymnasia are effective in motivating students to be musically active. However, we did not find any evidence that this high activity level would lead to any substantial enhancement of students' general, academic or even musical self-concept. Most probable, this is due to predominate underlying social comparisons in homogenous groups such as the classes in the elite musical gymnasia. In contrast, our study does provide evidence for the strong explanatory value regarding self-concept made up by variables in the individual learning environment. Thus, further studies that focus on effects of environmental determinants on personal development should not neglect this individual learning environment provided by parents and peers that is easily neglected in studies of educational quality.

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