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Identifying and Nurturing Gifted and Talented Students in Germany

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Identifying and Nurturing Gifted Student

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Policy Dialogue on

Identifying and Nurturing Gifted Students

Before addressing the topic at hand, a short introduction to the German school system is in order. An understanding of the basic topography of the school system is a prerequisite to discussing the promotion of gifted and talented students—gifted education—in Germany. In contrast to the situation in countries that merely mandate that children be educated, German law goes a step further by setting out general compulsory schooling as part of the state's educational mandate. In other words, parents in Germany are not allowed to homeschool their children. Children must attend school. As a rule, children start school at the age of six and go to school for at least nine years. In Germany, schools are not organized centrally at the federal level. Rather, schooling is a matter delegated to the ١٦ German federal states. Each federal state has its own ministry of education.

The range of subjects, curricula, and degrees as well as the regulations governing the transitions between school types can, and frequently do, differ from state to state. Depending on the state, children attend primary school for four to six years. After primary schooling, children are tracked into various forms of secondary education. The individual states accord parents different amounts of say in their children's tracking into secondary education; and the tracking practices have been debated by parents, teachers, researchers, and policymakers for decades now (e.g., Hanushek & Wößmann, ٢٠٠٦). The system of secondary schools is divided into non-college-track lower secondary schools (*Hauptschule* or *Mittelschule*), mid-level secondary schools (*Realschule*), university-preparatory secondary schools (*Gymnasium*), and comprehensive secondary schools (*Gesamtschule*), which offer various educational tracks within one school. The *Hauptschule* ends after grade ٩ or ١٠, the *Realschule* after grade ١٠. After that, young people can start vocational training or continue their schooling. *Gymnasium* concludes after grade ١٢ or ١٣, with successful students earning a certification (*Abitur*) that allows them to matriculate in the German university system in any field. In some subjects, students must wait a semester or more before starting their university studies depending on their grade-point average (GPA) in their *Abitur*, which reflects their school grades and scores on examinations at the conclusion of their secondary education.

١. The German *Gymnasium*: University-Preparatory Secondary School and its Historical Relation to Gifted Education in the Field of Academics

A series of reforms in the eighteenth century led to the establishment of *Gymnasien* (singular: *Gymnasium*) in Germany (Bruning, ٢٠٠٥). These college-preparatory secondary schools are based on the antique Greek concept of the *gymnásion* (Trautwein & Neumann, ٢٠٠٨) as learning institutions, specifically designed for excellence and talent development with sports-like rigor. Such *Gymnasien* did not focus on athletic disciplines but on academic fields.[١] A select few young males were to master a predefined set of intellectual pursuits through rigorous practice similar to the way Greek athletes were imagined to have practiced competitive sports disciplines (and some learning activities) in classical antiquity.

However, the establishment of the *Gymnasium* was not only based on late-eighteenth-century German enthusiasm for antique Greek culture. It was also socio-politically motivated. Starting with Prussia, German states began to regulate university access, which had been hitherto largely unregulated (Trautwein & Neumann, ٢٠٠٨), by making the secondary degrees offered by *Gymnasien* the prerequisite for university study. While gradual in nature, this

[1] Some portions of this text have been adapted from Ziegler, Stoeger, Harder, and Balestrini (2013).

transition is of great importance for the historical development leading to the modern education system in Germany. The changes in the eighteenth and nineteenth centuries in secondary education in Germany reflected a larger shift towards a more merit-based approach to regulating access to higher education that was also inspired by the *keju* or imperial examination system (科舉制度) in China, which had been described repeatedly over the centuries by Western missionaries in China (Martin, 1870; Têng, 1943).

As *Gymnasien* were the main gatekeepers of university access, for a long time they fulfilled the function of magnet-style schooling for the intellectually gifted (Trautwein & Neumann, 2008). However, in recent years, *Gymnasien* have greatly expanded enrollments. With around one third of pupils now completing college-preparatory secondary schooling in Germany (Malecki, Schneider, Vogel, & Wolters, 2014; Weishaupt et al., 2010), the nineteenth-century view of passively equating the *Gymnasium* with a type of gifted education has become anachronistic—although international comparative tests of educational achievement such as the Programme for International Student Assessment (PISA) indicate that, on the whole, students attending *Gymnasium* are still achieving academically at substantially higher levels than pupils in the two less academically rigorous forms of secondary schooling (e.g., Reiss, Sälzer, Schiepe-Tiska, Klieme & Köller, 2016).

The past two decades have witnessed rapid, fundamental, and far-reaching modifications in the attitudes held and approaches taken to the topic of giftedness by schools, researchers, and ministries of education in Germany. To provide insight into how the German school system approaches gifted education today—above and beyond the historical provisions of tracking into different forms of secondary education—I will now describe gifted education provisions offered inside and outside of German schools.

2. Gifted Education Inside and Beyond German Schools

Just as the overall school regulations differ from one state to the next in Germany, the policies and provisions established over the past roughly 25 years (Fels, 1999) with respect to gifted education also differ substantially from one state to the next. Due to the heterogeneity of school regulations among German states, a comprehensive summary is not possible here, especially as the regulations also reflect differing conceptual views of giftedness and gifted education. In the following subsections, I discuss selected salient aspects of gifted education within Germany in some detail. The most comprehensive and up-to-date overview of all manner of gifted education provisions for all 16 German federal states is provided online by the Karg Foundation, a charitable organization that advocates for gifted education in Germany (Karg Foundation, 2019). However, the information provided there lacks the explanatory contextualization that readers unfamiliar with the German education system will undoubtedly require to understand the provisions, which I endeavor to provide for readers with this contribution.

2.1. Gifted Education Inside German Schools

Ever more federal governments have added explicit or indirect references to giftedness and talent to the laws and regulations governing their pre-K–12 school systems. All federal states use different kinds of acceleration and enrichment strategies. Some federal states also have magnet schools and gifted classes in regular schools and consider aspects of giftedness in teacher training and counseling. In the following, a short overview will be given of some of these measures.

Acceleration. All German states allow some form of early school entry. A study shows that the percentage of children who were granted early access to first grade increased over the last

decades (Weishaupt et al., 2010). With varying restrictions and provisions, all German states also allow some form of grade skipping, although, not all states have programs that actively seek out gifted pupils and inform their parents. Several states offer and test various methods of allowing groups of students to move more quickly through secondary education. Another widespread accelerative measure is early university entrance, which can now be found in one form or another in all 16 federal states (Karg Foundation, 2019).

Enrichment. Enrichment programs that are conducted in cooperation with schools but remain outside the scope of pupils' everyday school experiences (e.g., irregular or occasional day trips to universities, annual talent competitions, or summer academies) are common within the German school system. In-school enrichment offerings cover a wide gamut of provisions such as special clubs for gifted pupils, special studios for artistic or creative work, facilities for self-regulated learning, additional and advanced instructional offerings during and beyond the hours of normal school instruction, and school leadership programs. By now, it is also common in some federal states to release pupils from regular instruction and offer enrichment opportunities within the school or out of their schools during this time.

Magnet schools and classes for the gifted. Although certain types of magnet schools such as subject-specific college-preparatory secondary schools with a special focus on, for instance, music or science, technology, engineering, and mathematics (STEM) have a long tradition in Germany, magnet schools for intellectually gifted students were, until recently, unusual. As college-preparatory secondary education has expanded, so have special schools and classes for intellectually gifted children. By now, almost all German states either have or are planning schools or classes with a special focus on intellectually gifted pupils. Examples of such schools for the gifted are the *Internatsschule Schloss Hansenberg*, the *Landesgymnasium Sankt Afra*, and the *Landesgymnasium für Hochbegabte Schwäbisch Gmünd*.

A particularly successful and widespread case of magnet-school-embedded gifted-education enrichment in German schools has evolved in recent years in the area of accredited high-achiever-focused enrichment offerings in STEM. As of writing, 313 high-achiever-track secondary schools throughout Germany are STEM-certified magnet schools (MINT-EC, 2019) within the network of the German association known as the Excellence Center for Mathematics and Natural Sciences in Schools (*Verein mathematisch-naturwissenschaftlicher Excellence-Center an Schulen*). The 313 STEM-certified schools account for about 10% of all high-achiever-track secondary schools in Germany (Statista, 2019).

Schools must apply to become STEM-certified schools. During the annual application process, an independent panel of experts judges the profiles of applying schools on the quality and quantity of each school's STEM offerings. The STEM-certified schools reflect key hallmarks of the certification process (e.g., STEM as a fundamental educational component; in-school STEM training reflecting the needs of business and industry; additional career guidance counseling in STEM; networking among teachers and principals in STEM-certified schools; a focus on STEM provisions for gifted pupils; partnerships between companies in STEM and STEM-certified schools; evidence that STEM-certified schools are making a contribution to improving the quality of STEM education in Germany; see Sarantidou, 2015, for more information). Finally, a recertification process ensures that STEM-certified schools maintain high standards after they have received their initial certification. Schools that have achieved this certification have fulfilled the Excellence Center's stringent certification requirements. The schools have a distinctive profile in science, technology, engineering, and mathematics and provide a wide range of STEM events and programs for students as well as training offerings and qualified exchanges for teachers and principals that go far beyond the STEM instruction set out in the regular curriculum (Sarantidou, 2015).

While detailed research on the long-term effectiveness of in-school STEM enrichment provisions for gifted and talented pupils in Germany remains a desideratum in the research literature, an early examination of the learning and educational capital of girls and boys enrolled in the aforementioned STEM-certified magnet schools in Germany provided some evidence that the schools with accredited STEM enrichment programs appear to have been successful at bringing together students with greater levels of motivation for excelling in STEM. In a study I conducted with members of my research group in 2016, we found that students enrolled in the high-achiever-track STEM-certified magnet schools in Germany were more likely to register for an additional, extracurricular program focused on STEM talent development (Stoeger, Greindl, Kuhlmann, & Balestrini, 2017). From the standpoint of talent development, this finding is propitious, because we know from earlier research that longer-term programs requiring substantial commitments on the part of pupils are particularly effective (DuBois, Holloway, Valentine, & Cooper, 2002; Lengfelder & Heller, 2002).

Mentoring. Despite evidence of its effectiveness as an in-school gifted-education provision (Bloom, 1985; Stoeger & Ziegler, 2012), in-school mentoring programs have been far and few between. A major new initiative of the German Federal Ministry of Education and Research (in German, *Leistung macht Schule* or LEMAS for short)—the German name of which roughly translates to *It's All About High Achievement*—is now focusing on mentoring as one of a suite of potent in-school provisions for promoting the development of the nation's high-achieving students (Stoeger, Emmerdinger, & Ziegler, in press). While the development, rollout, and evaluation of the program will take years, earlier findings and theoretical insights suggest that the new attention given to in-school mentoring will likely pay off for the gifted pupils and the country.

Teacher training. Most German states address giftedness in university teacher training and during in-service training. They have also produced informational material about gifted education designed for use in their respective teacher-training systems. A European certificate program for gifted educators based on the guidelines set by the European Council for High Ability (ECHA) is also widespread in Germany. In sum, German-speaking teachers have access to a growing number of certificates and advanced-degree programs in gifted education (Hany et al., 2010).

2.2. Gifted Education outside of German Schools

Scholastic gifted education is complemented in Germany by the offerings of nonprofit and commercial institutions as well as by universities, some of which cooperate closely with schools. Because of space constraints, only a few examples of such offerings will be presented.

Scholarships. There is a long tradition of providing the most outstanding students with scholarships in Germany, both in K–12 and in tertiary education. A list published online by the German Federal Ministry of Education and Research shows the variety of such offerings (Bundesministerium für Bildung und Forschung, 2013). Such scholarships are particularly important for pupils whose low socio-economic status (SES) tends to reduce their access to certain educational resources (Ziegler & Stoeger, 2011). This sort of gifted promotion is inherently problematic, however, as it often fails to offer focused learning assistance.

Competitions. Other approaches traditionally taken to promote giftedness outside of schools include national and international Olympiads and other competitions in various subjects (Oswald, Hanisch, & Hager, 2005). Although such competitions used to be more focused on

the final product (often a performance of sorts) and thus had more of a show or performance character, more recently, they have begun to stress other aspects. Increasingly, such competitions are designed more like workshops. Participants do not simply meet to compete against one another but to prepare and learn together. This development may reflect the increasing popularity of the maker movement within education (Rosenfeld Halverson & Sheridan, 2014).

Summer camps and summer schools. Summer camps and summer schools designed for gifted children are also setting new priorities and have begun to take more sophisticated approaches. Rather than being structured simply around a given content area, such programs now assist gifted pupils in developing targeted learning skills and social-emotional competencies (Ziegler, Stoeger, Harder, & Balestrini, 2013). This more educationally informed focus reflects the fact that the stabilization of new skills is only likely to succeed when participants possess effective learning skills and enjoy the support of an effective social network.

Giftedness counseling. Giftedness counseling comprises another pillar of gifted education and promotion. Such services are directed at two groups of stakeholders in particular, families and institutions (Ziegler, Grassinger, & Harder, 2012). Parents frequently seek advice on how to promote the development of a child's abilities and skills, on how to overcome obstacles during learning and talent-development processes, and on choosing the best gifted-education options. Institutions of various sorts (e.g., schools and governments) often seek the advice of experts on how to develop and provide scientifically proven gifted-education services. Institutions must make various policy decisions about access restrictions as well as curriculum, methods, and personnel training. When working with the two groups, the challenge for counselors is to consider the manifold personal and environmental influences on the development of an individual's skills and abilities and the complex interplay of these factors. Of the numerous private, state, and university-based giftedness counseling centers found throughout Germany, most centers provide *individual counseling* for the first group only. A fundamentally different approach is that of *systemic counseling* established to serve the second group.

Systemic counseling. In Germany, international studies of educational achievement such as the Programme for International Student Assessment (PISA) led to demands that education systems be improved in general and that gifted education be anchored within school systems in particular. In the ensuing roughly 20 years, the demands have led to the establishment of state-mandated or state-supported offices and consortiums responsible for the coordination of efforts between governments, researchers, and schools. Such offices work to bring together various educational stakeholders to effect synergistic change. They reflect a fundamentally systemic approach in their efforts at effecting changes among these various parties that facilitate a comprehensive, effective system of gifted education and promotion.

Individual counseling. Individual counseling supports children, families, and educators in finding solutions to their individual needs and for the children's long-term development in a talent domain. As each individual counseling relationship varies in nature, effective counseling strategies need to be highly flexible. Giftedness counseling offices located at various universities have developed counseling strategies designed to ensure high-quality professional giftedness counseling. As various theories of giftedness are in use, the chosen theoretical counseling approaches also vary considerably from office to office. Thanks to a literature review of gifted counseling concepts currently in use in German-speaking regions (Ziegler, Grassinger, & Harder, 2012), we now have a better understanding of the differences between and the developmental trends in such counseling offices. Over the past years,

systemic counseling approaches have become increasingly common (Stoeger & Ziegler, 2009). One focus of these approaches is to identify and develop individual learning paths toward excellence for gifted students in their respective talent domains (Ziegler, Grassinger, Stoeger, & Harder, 2012).

3. Identifying and Transforming Youngsters' Gifts and Talents

Theoretical models and conceptions of giftedness are extremely heterogeneous—not only around the world but even within one country such as Germany (Sternberg & Davidson, 2005; Ziegler, et al., 2013). The variegated nature of giftedness conceptions also shows up in gifted identification (Balestrini & Stoeger, 2016). Broadly speaking, four different approaches to giftedness identification have been common in Germany (Ziegler, 2018): status-oriented, intervention-oriented, development-oriented, and support-oriented diagnostics.

Status-oriented diagnostics. Status-oriented diagnostics is the most traditional approach. It aims to identify gifted individuals by specifying their relative positions within a population. The assumption behind the approach is that higher values for desirable individual characteristics or traits (e.g., IQ, achievements, effective information processing) predict exceptional achievements. The assumption means—in theory—that predictive strength can be improved through the combination of predictors. In practice, however, status-oriented diagnostics is frequently reduced to the use of one single diagnostic indicator, which to the end of effective identification is highly problematic (Stoeger, Balestrini, & Ziegler, 2018).

Intervention-oriented diagnostics. In this approach, factors implicated as determinants of underachievement are the diagnostic focus. Researchers hone in on variables that help them to explain discrepancies between IQ and achievement (as underachievement is often defined). Intervention-oriented diagnostic work thus looks at factors such as insufficient motivation, incommensurate learning and working behavior, specific personality factors, sociocultural factors, and inadequate educational support or resources (Reis & McCoach, 2000).

Development-oriented diagnostics. Whilst the interest within intervention-oriented diagnostics in unexpectedly low achievement outcomes provided a much-needed fillip to the largely status-oriented, trait-driven approach of earlier researchers, the intervention focus came at a price. It focused researchers, educators, parents, and the gifted children on the children's supposed intellectual, emotional, and academic *deficits*—without providing a suitable perspective on how to remediate them. The development-oriented diagnostic paradigm arose in light of this educationally myopic perspective and transcended both previous approaches by focusing more on achievement development. The goal of the approach is to make the best possible prognoses for individuals' continued talent development. A touchstone of the approach is the ongoing prediction of future achievement development in light of all available cumulative achievement information. What constitutes a gift or talent at any given moment thus depends on the current developmental stage and learning behavior, not on IQ (Subotnik & Jarvin, 2005). The development-oriented diagnostic approach no longer operationalizes giftedness as a fixed, but rather as a dynamic, emergent process.

Support-oriented diagnostics. This approach reflects the next logical step. Rather than constantly reappraising individuals' likely developmental trajectories based on the most recent diagnostic information, support-oriented diagnostics actively constructs novel developmental chances for individuals. In this sense, and to an educationally meaningful end, it constitutes not only an observational (diagnostic) approach, but also an intervention. The

approach identifies ways in which an individual's development towards high achievements and excellence can be facilitated. Consequently, gifted identification and education are no longer viewed as separate activities. A learning path towards achievement excellence is constructed on the basis of various types of diagnostic information and in light of goals for specific types of talent development. As the ensuing learning path is being traversed by a learner, the diagnostic process continues and its results are used to continually adapt and improve the learning path in light of selected goals (Ziegler & Stoeger, 2004). The hybrid diagnostic-interventionist process relies on numerous classes of information. The process systematically considers individual aspects (e.g., learning behavior, cognitive abilities, goals, concentration) and contextual variables as well as how the individual uses learning opportunities within the learning environment and deals with setbacks. In doing so, it integrates the perspectives of various stakeholders in an individual's talent development (e.g., parents, teachers, and mentors).

4. Research

Numerous studies have been conducted in Germany on the adequacy of theoretical conceptions of giftedness and counseling, on identification methods, on interventions and their effectiveness, and on teacher-training programs and their effectiveness. Researchers have also studied the characteristics, developmental trajectories, and learning behaviors of gifted students (for an overview, see Ziegler, et al., 2013).

Two longitudinal studies of gifted pupils provide important insight into characteristics of gifted students and their development: the Marburg Giftedness Project (Rost, 2000, 2009) and the Munich Study of Giftedness (Heller, 2001). Starting in 1987, the Marburg Giftedness Project assessed pupils who were in third grade at the time and then tracked their development over the course of the ensuing six years. The project compared the development of two groups of high school students who were attending regular classes: a sample of gifted high school students (defined as those with an IQ above 125) and a sample of high school students with average IQs. The study considered students' cognitive and academic achievements and their psychosocial wellbeing. Results indicated that both samples of high school students included high performers. Quite unexpectedly, only 15% of high performers were found in the group of students with IQs above 125. The study also found that 15% of the group with high intelligence were underachievers.

Both findings from the Marburg Giftedness Project belied the notion that intelligence and school performance are of a piece and cast an ominous epistemological shadow on the basic definition of giftedness—equating giftedness with high IQs—common in Germany at that time. The study's findings regarding psychosocial variables were also unsettling for the contemporary scientific consensus. Contrary to widespread stereotypes in Germany at the time, the study showed that the highly intelligent students of the sample tended to be socially well integrated, psychologically stable, and self-confident.

The Munich Study of Giftedness (Heller, 2001) evaluated special classes for gifted pupils in schools in the German state of Baden-Württemberg over a 10-year period. The classes combined acceleration (curriculum compressing) and enrichment elements. Gifted students completed the nine years of college-preparatory secondary education (grades 5–13) that were mandatory at the time in eight years. In contrast to Rost's (2009) approach in the Marburg Giftedness Project, the Munich Study of Giftedness selected its participants after grade 4 according to a multidimensional model of giftedness (Heller, Perleth, & Lim, 2005). Students who were identified as gifted attended the special classes in grades 5–10. They then skipped eleventh grade and entered classes with regular students during grades 12 and 13 to prepare for their comprehensive exams leading to the aforementioned *Abitur* (university-

entrance qualification). Kurt Heller and his team of researchers recruited control groups from schools that did not offer the special classes as described above.

Results from the Munich Study showed that advantages in cognitive abilities and performance observed among the gifted classes during fourth grade grew over time. Yet by the end of tenth grade, student assessments indicated no significant differences in classroom management and teaching style between the two types of classes. One structural difference between the groups did emerge, however. In the gifted classrooms, individual teacher support was more closely associated with motivation and performance (Reimann & Heller, 2004). The Munich Study of Giftedness also showed the influence of IQ on performance decreasing over the years (Perleth & Sierwald, 2001). Follow-up studies showed, moreover, that the predictive strength of IQ for academic performance continued to decline after secondary schooling. Other factors such as students' interests, the availability of learning opportunities, and the accessibility of like-minded peers turned out to be stronger predictors of academic achievement (Perleth, 2001).

Researchers have also examined inclusive gifted-education measures in German-speaking schools (i.e., provisions aimed at high-IQ and high-achieving pupils in more heterogeneous classes). This work has looked at integrative gifted education in regular classrooms, classrooms with children with disabilities, multiage classrooms, and early university placement programs (for an overview, see Ziegler et al., 2013). A key focus within this line of research is on effective learning behavior and self-regulated learning for gifted students within regular classrooms (Stoeger, Fleischer, & Obergriesser, 2015). Research confirms that interventions focused on learning behavior and self-regulated learning in regular classrooms can be effective for both gifted achievers and gifted underachievers (Sontag & Stoeger, 2015; Stoeger & Ziegler, 2010; Stoeger et al., 2015).

Researchers have also examined extracurricular enrichment programs, some of which are coordinated with scholastic offerings and some of which are purely extracurricular. Two examples in this area are Heller's (2009) eight-year longitudinal evaluation of the Hector Seminar—a highly selective long-term gifted-education-support program in science, technology, engineering, and mathematics (STEM) offered to pupils in southern Germany—and the ongoing evaluation of the CyberMentor Program (Stoeger, Hopp, & Ziegler, 2017).

The Hector Seminar offers its gifted participants three types of support. First, the program offers subject-specific support to help participants develop domain-specific knowledge and skills. Second, participants receive guidance in a host of ancillary talent-development areas (e.g., mentoring, enrichment, and learning skills). Third, the Hector Seminar works to effect positive changes in pupils' traditional learning environments by working closely with participants' teachers.

CyberMentor is the biggest research-based online mentoring program in STEM in Germany. Participants are female students from university-preparatory secondary schools, of 12–18 years of age, and from all over Germany. Each girl receives guidance from a personal female mentor who has a university degree in STEM. The communication with the mentor as well as with the other mentees and mentors in the program (up to 800 mentees and 800 mentors per year) takes place on a secure online platform via internal email, chat, and forum systems. Each mentoring dyad (i.e., a mentee and a mentor with similar STEM interests) is linked to another dyad on the platform. The forum, chat, and email systems also enable communication with other participants outside the mentoring-dyad. Together, the participants discuss interesting STEM topics and collaborate on STEM projects online.

To determine whether positive changes in attitude and behavior are actually results of participation in the CyberMentor program, the longitudinal development of participating girls is being compared with that of various control groups, including a waitlist control group of girls who applied for the program but were only allowed into it one year later. There are also follow-up studies several years after program participation. Evaluations of both interventions

revealed positive effects for participants such as increased levels of self-confidence, interest, and STEM activities outside of the interventions. Results also indicate higher participation rates and elective intentions in STEM and improved achievements.

Various other research questions on giftedness have been examined by other studies carried out in Germany. Researchers looked, for instance, at the implicit personality theories of giftedness held by students (Ziegler & Stoeger, 2010a) and teachers (Baudson & Preckel, 2013); and various aspects of the identification of giftedness have been tested (Endepohls-Ulpe & Ruf, 2005; Hany, 2001). One area of giftedness-identification research that has received considerable attention in Germany—despite a concomitant lack of international attention—is the connection between fine-motor skills and gifted (under-)achievement. Findings of research conducted in Germany indicate that fine-motor skills have an incrementally predictive value for math achievement beyond the predictive contribution of cognitive abilities (Stoeger, Ziegler, & Martzog, 2008; Ziegler & Stoeger, 2010b). Furthermore, differences between gifted achievers and underachievers were explained best by fine-motor skills and their interaction with concentration (Stoeger & Ziegler, 2013; Stoeger et al., 2008). Fine-motor skills had a significant influence on the results in IQ tests and therefore on the identification of giftedness (Ziegler & Stoeger, 2010a). These findings may prove useful for developing more effective identification and intervention methods. Therefore, they are likely also useful for work being done in other cultures.

5. Closing Remark

One of the most important challenges currently faced by those involved in gifted education and research in Germany is continuing to modernize the identification processes and the educational offerings for gifted students. The challenge has been apparent for a long time now. Already in the early 1990s, gifted education experienced a crisis of confidence that shook the foundations of a field with hitherto largely unexamined roots in procrustean early-twentieth-century modernism (Gould, 1996) and in educational progressivism born of the Sputnik crisis (Stoeger, 2009). Lipsey and Wilson's (1993) meta-analysis of the average effect sizes of the most common methods of gifted education led to a turning point in the field. They found existing accelerative and enrichment measures to be largely incapable of supporting talented students' development. The average effect sizes ranged from small to, at best, moderate. After accounting for publication bias and placebo effects, the already low effect sizes fell more or less to null.

The crisis of confidence was salubrious for the field, however. It helped effect a move toward more effective types of giftedness promotion. Individual learning processes and systemic aspects became more important. This development along with the system-wide changes in German secondary education described above have led to some consensus in the country for the practice of gifted education in three areas: (a) the establishment of mentoring systems in which mentors help to plan optimal learning pathways, (b) the incremental improvement of learning behavior and self-regulated learning skills to help students adapt to more challenging learning settings (e.g., schools for the gifted), and (c) the development of a systemic approach to gifted education that considers both individual and environmental aspects and their interplay (Ziegler & Stoeger, 2017).

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