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Giftedness and Talent

What Educators and
Psychologists Need to Know

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Giftedness and Talent

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Preface

Giftedness and talent are central for understanding and fostering human potential and represent important and exciting research topics. In recent years, numerous new findings on these topics have appeared, some of them as systematic overviews in the form of literature reviews or meta-analyses. The increasing number of publications, journals, or training courses in this area underscores the rapid development in this field. This book summarizes important new findings, results, and conceptions. It was first published in Germany by Franzis Preckel and Miriam Vock as a textbook on giftedness and talent. A second, revised edition appeared in 2021. With this book, the second edition is now also available adapted for the English-speaking community. The team of authors was strengthened by Paula Olszewski-Kubilius as an expert in the field from the USA. With the international readership in mind, we adjusted information on the identification and assessment of giftedness and talent and on special fostering options and programs in particular. With this book, we do not aim to cover the field completely, but have concentrated on what we consider to be the core basics for entering the subject area. We provide references to further literature, especially on topics that receive less attention in this book but are nevertheless of great relevance (e.g., counseling in giftedness). Thus, the book can also be used for training educators and psychologists, for example, within a seminar.

In the following, we give a brief summary of the chapter contents. We begin with the basic question of what giftedness is and how it relates to exceptional performance. We present the difference between definitions of potential and performance as well as between unidimensional and multidimensional definitions of giftedness. In addition, we discuss the role that intelligence and creativity play in giftedness, and present basic knowledge about both constructs. Furthermore, regarding the connection between giftedness and exceptional performance, we offer a critical perspective on the respective contributions of the differential approach of giftedness research and of expertise research.

In the second chapter, you will become acquainted with three pioneering longitudinal studies with gifted students: the Terman Study and the Study of Mathematically Precocious Youth from the USA and the Marburg Gifted Project from Germany. We describe the goals of these three central longitudinal studies in giftedness research, their methodologies and design, and their main results. In addition, we discuss the respective methodological strengths and weaknesses of the studies and which particular research methodological challenges scientists in giftedness research face.

The third chapter is about what gifted people are like and whether there are any special features in their personality and development. In this chapter, we describe the relationship between intelligence and academic achievement. We distinguish between implicit and explicit theories of giftedness, deal with the harmony and the disharmony hypothesis, and cover the state of research

on this; in particular, we describe those characteristics on which gifted individuals as a group differ from non-gifted individuals and those on which they do not differ. Regarding the topic of gender differences, we present the gender-similarity hypothesis and the greater-male-variability hypothesis. In addition, we introduce the topic of gifted underachievers, i.e., individuals whose level of achievement falls significantly short of their abilities, and present the factors that contribute to the development of underachievement in gifted individuals. We deal with the special situation of highly gifted individuals and the possible effects of permanent underchallenge in school. Finally, we look at families with gifted children and focus on gifted children from lower income families and minoritized students.

The fourth chapter deals with how gifted students can be identified. Intelligence tests continue to play a central role here, and you will learn what to consider when selecting intelligence tests for giftedness diagnostics and about the problem of ceiling effects in many of the available test procedures. We describe in which situations supplementary school performance assessments are useful or necessary and which methods you may use. We introduce assessment strategies for the identification of minoritized gifted students. We further distinguish and evaluate different strategies for identifying gifted underachievers. We describe ways to assess divergent thinking as part of creativity diagnostics and critically discuss the problems involved in using checklists and nomination procedures. Furthermore, we give two examples on dealing with the problem of integrating different findings and results in school practice.

Finally, the fifth chapter examines supporting gifted students in school and early childhood education. We give an overview of the different pillars of gifted education, and present basic principles for teaching that also challenges gifted students. In addition, we cover typical measures of acceleration and enrichment in school and early childhood education. We summarize research findings on how different programming approaches affect the achievement development and social and emotional development of gifted students and critically evaluate these research findings. By doing so, we discuss the advantages, disadvantages, and conditions for success of the various measures.

We hope that this book will fulfill the goals we have set for it and that it will facilitate and stimulate teaching and self-study on the topic of giftedness and talent. We would be pleased to receive feedback and further suggestions!

December 2023

Franzis Preckel, Miriam Vock & Paula Olszewski-Kubilius

Contents

Preface	v
1 What Is Giftedness?	1
1.1 Introduction	1
1.2 Theories and Models of Giftedness and Exceptional Achievement	5
1.2.1 Expertise	5
1.2.2 Models of Giftedness	8
1.2.3 Performance Definitions Versus Potential Definitions	9
1.2.4 Unidimensional Definitions	10
1.2.5 Multidimensional Definitions and Models	11
1.2.6 Systems Theory Models	17
1.2.7 Mega Model	18
1.2.8 TAD Framework	22
1.2.9 Conclusions	25
1.3 The Role of Intelligence in Models of Giftedness	26
1.3.1 What Is Intelligence?	27
1.3.2 The Intelligence Quotient	33
1.4 The Role of Creativity in Models of Giftedness	36
1.4.1 Creativity: Definition and Models	36
1.4.2 Creativity as a Systemic and Relational Phenomenon	40
1.4.3 Creativity and Intelligence	41
1.5 Conclusion	44
2 Pioneering Studies and Methodological Challenges in Giftedness Research	46
2.1 Selected Longitudinal Studies on Gifted Students	46
2.1.1 Terman Study	47
2.1.2 Study of Mathematically Precocious Youth	50
2.1.3 The Marburg Giftedness Project	53
2.2 Methodological Challenges in Researching Giftedness	56
2.2.1 Sample Selection and Groups Not Selected	56
2.2.2 Using an Appropriate Control or Comparison Group	57
2.2.3 Participants' Knowledge of Their Own Aptitude	58
2.2.4 Intervention Versus Pure Observation	59
2.2.5 Different Definitions and Operationalizations of Giftedness	59
2.3 Conclusion	60

3	Characteristics and Development of Gifted People	62
3.1	Achievement-Related Characteristics	62
3.1.1	Relationship Between Intelligence and Achievement	62
3.1.2	Studies on the Academic Development of Gifted Students	64
3.1.3	Threshold Hypothesis on the Relationship Between Intelligence and Achievement	67
3.2	Personality-Related Characteristics	68
3.2.1	Implicit Theories: Everyday Conceptions About Gifted People	69
3.2.2	Socioemotional Adjustment of Gifted Individuals	72
3.2.3	Personality Traits	76
3.2.4	Gender Differences	80
3.3	Underachievement	84
3.3.1	Concept	84
3.3.2	Possible Causes	87
3.3.3	Progression	89
3.4	Peculiarities in the Development of Gifted Children	91
3.4.1	Asynchronous Development	91
3.4.2	Special Features of Exceptional Giftedness	92
3.4.3	Persistent Underchallenge in School	92
3.4.4	Perfectionism	93
3.4.5	Increased Sensitivity (Overexcitability)	94
3.4.6	Fear of Prejudice and Stigmatization	95
3.5	Family Background of Gifted Individuals	96
3.5.1	Giftedness as a Stressor for the Family?	96
3.5.2	Gifted Children From Lower Income Families and Minoritized Students	97
3.6	Conclusion	100
4	Giftedness Identification and Assessment	103
4.1	Introduction and Overview	104
4.2	Intelligence Tests in Giftedness Identification and Assessment	105
4.2.1	Possibilities and Limitations of Intelligence Tests in Giftedness Identification and Assessment	107
4.2.2	Assessment Strategies for Identification of Minoritized Students	110
4.2.3	Description of Intelligence Tests With Regard to Their Suitability for Use With the Gifted	113
4.3	School Achievement Assessment	122
4.3.1	Gifted Identification	122
4.3.2	Selection of Suitable Students for Special Programs	123
4.3.3	Recognizing Underachievement	123
4.3.4	School Grades	123
4.3.5	Standardized School Achievement Tests	126
4.4	Assessing Underachievement	130

4.4.1	Statistical Methods for Identifying Underachievement	131
4.4.2	Nomination Methods for Identifying Underachievement	135
4.5	Assessment of Creativity and Divergent Thinking	136
4.6	Nominations and Checklists	140
4.6.1	Nominations by Teachers	140
4.6.2	Nominations by Parents	142
4.6.3	Peer Nomination and Self-Nomination	142
4.7	Selection Process for a Gifted Class as an Example of a Multimethod and Multimodal Approach to Identify Giftedness	143
5	Support in School and Early Childhood Education	147
5.1	Introduction	147
5.2	Support of Gifted Children at School	148
5.2.1	The Four Pillars of School-Based Support for Gifted Students	151
5.2.2	Differentiation Within the Classroom	156
5.2.3	Acceleration	164
5.2.4	Enrichment	176
5.2.5	Combination of Acceleration and Enrichment: Early Entrance Programs	182
5.2.6	Ability Grouping for Gifted Students in Special Classes and in School ..	184
5.3	Support in Early Childhood and Preprimary Education	190
5.3.1	Gifted Children in Early Childhood and Preprimary Education	190
5.3.2	Support Opportunities in Early Childhood Education	192
5.4	Conclusion	195
	Afterword	197
	References	199
	Glossary	237

1 What Is Giftedness?

This chapter primarily addresses two lines of enquiry: “What is giftedness, and how can it be defined?” and “What is the connection between high ability and exceptional achievement?”

The learning objectives for this chapter are:

- After working through this chapter, you will be able to distinguish between definitions of potential and performance, and between uni- and multidimensional definitions of giftedness.
- When it comes to the connection between giftedness and exceptional achievement, you will be able to identify and critically evaluate the respective contributions of giftedness research and expertise research.
- You will comprehend what role intelligence plays in models of giftedness, and you will have acquired a foundational understanding of the structure of intelligence and the intelligence quotient (IQ).
- You will be able to distinguish various definitions of creativity and to describe what role creativity plays in different models of giftedness.

Learning objectives

1.1 Introduction

Case Example 1 (based on Arnold and Preckel, 2011)

Olivia

Olivia is in the second grade in her elementary school and, to date, has been a very good student. Over the last few weeks, her teacher has noticed that Olivia often daydreams and that she is increasingly making errors when completing tasks – even in subjects that she had mastered in the past. At home, Olivia is increasingly reluctant to go to school. She is also becoming gradually more uncertain about her own abilities. Then Olivia’s parents talk to her teacher and with a school psychologist who conducts an intelligence test with Olivia. With Olivia’s consent, it is decided that, for the next 2 weeks, she will join the third-grade class on a provisional basis. Olivia enjoys herself there and the initial trial period is extended by 2 weeks. All parties then agree that Olivia should stay in the third-grade class. Since then, things have been going better for Olivia at home and in school. On most days she is happy to go to school. Olivia is able to fill in the gaps in her knowledge after a couple of weeks. The fact that she sometimes now has to read a task a second time in order to solve it is something new for her. Now Olivia has a lot more confidence in her abilities than she did before she moved into the third grade early.

Yusuf

Yusuf is an open-minded boy who is interested in lots of different things. He is in the sixth grade of middle school. He finds it easy to win people over with his charm and eloquence. At the moment, however, Yusuf is at risk of having to repeat a year.

In primary school, things came very easily to him: He spent whole hours staring out the window or writing stories that he had made up himself. His teachers generally left him alone because, usually, he was able to answer questions correctly. This meant that, in primary school, Yusuf's grades were consistently good, sometimes excellent, without him having to make much of an effort. This situation changed when he transitioned to middle school. Suddenly Yusuf had to learn vocabulary and other kinds of content, and he had no idea how to do it. His grades got worse and worse. Many teachers now found his behavior arrogant. ("He just skim-read the text, but still wants to discuss all the reasons why the author is fundamentally wrong.") Yusuf does not tell anyone how desperate he feels about the prospect of having to repeat a year.

Jasmine

Jasmine is 5 years old and has been going to school for the last 4 months. She has been able to read since the age of 4, and now she is able to read short stories to her parents at bedtime. For the last 9 months, Jasmine has been playing chess in her local chess club and she is also interested in chemistry experiments. Jasmine asks lots of questions about, for instance, what happens to people after they die and what fairness actually means. Afterward, she can sometimes be very thoughtful or even feel down when she understands that, for instance, things in life can be very unfair. If she is able to discuss these things with her parents, she cheers up pretty quickly. According to her teacher, Jasmine is an open-minded and friendly student in class who learns very quickly and is very popular. When she finishes tasks quicker than the other children in her class, the teacher lets her read books she has brought in herself.

As Case Example 1 shows, gifted children can be very different from each other. Olivia suffers from not being challenged enough in school; for Jasmine this does not appear to be a problem. Jasmine has very good grades, while Yusuf is at serious risk of being held back a year. But none of them are wunderkinds like the American Michael Kearney (Preckel et al., 2018) who was able to speak whole sentences at 4 months old, to read at 15 months, and solve mathematical equations at 3 years old. At 6 years, he was the youngest college student in human history; at 10 years he was the youngest ever university student. This kind of development is, of course, astounding. But it is not characteristic of the large majority of "completely normal" gifted children that we are discussing here.

**Giftedness:
very high
achievement-
related
developmental
potential**

What does it mean to be gifted or highly gifted? Giftedness refers, in a generalized way, to someone's achievement-related developmental potential. Thus, being gifted refers to someone who has a very high achievement-related developmental potential. Being highly gifted refers to someone who has an exceptionally high achievement-related developmental potential. Being gifted or highly gifted always relates to a specific area of achievement (*a gift for what?*). So giftedness can relate to the most varied domains: from academia and sport to music. The so-called Marland Report (Marland, 1972; a report commissioned by the US Department of Education to explore giftedness among students in the American school system), differentiates between six different areas of giftedness: general intellectual ability, specific academic ability, creative or productive thinking, leadership ability, visual and performing arts, and psychomotor ability.

In this chapter, we are going to focus on *intellectual giftedness*, and at this juncture will largely ignore giftedness in, say, music or sport.

Definition: Intellectual giftedness

Intellectual giftedness refers to a very high achievement-related developmental potential for achievement in areas in which information processing, learning and knowledge acquisition, abstract thinking, problem solving, and the development of new ideas are relevant. As such, intellectual giftedness is necessarily a very broad construct, because there is hardly any area of life in which learning, abstract thinking, or problem solving do not play a role.

It is important to keep in mind that “giftedness” is a construct, i.e., an invented theoretical term to explain certain phenomena. In science, giftedness was originally used to *explain* exceptional achievement (“How is someone able to perform at an exceptional level?”). But how do we even judge when someone’s achievement or their achievement-related developmental potential is exceptional? To make this assessment, we can use a variety of criteria (see Box 1).

Box 1. Criteria for exceptional achievement potential and exceptional achievement (based on Sternberg & Zhang, 2004)

- **Excellence criterion:** A person exhibits clear superiority over their peers in one or more areas.
- **Rarity criterion:** A person has a highly expressed attribute that is uncommon among their peers.
- **Productivity criterion:** The person’s giftedness must clearly lead to production. That is, it must enable the person to generate specific products or ideas, or to perform specific actions. (This criteria helps explain why, for instance, someone who won a trivia game show would not be considered to be gifted on that basis alone.)
- **Demonstrability criterion:** The particular achievement potential in one or more areas has to be demonstrable using a valid means of testing (for instance, an intelligence or achievement test).
- **Value criterion:** A person shows exceptional potential in an area that has value in their particular environment or culture.

In the field of psychology, research into giftedness began in the second half of the nineteenth century. Researchers were looking for personal prerequisites for exceptional performance, such as aspects of giftedness that differentiated people in terms of their achievement potential (what we call the *differential approach to giftedness research*). Francis Galton (1822–1911), a cousin of Charles Darwin, was one of the first people to assume that genetically codetermined differences in intelligence are the root cause of exceptional achievement. To this day, intelligence plays a central role in research into giftedness. Intelligence-based definitions of giftedness posit that a high level of intelligence is a necessary and sufficient condition for intellectual giftedness: however, the majority of models supplement intelligence with other constructs (see Section 1.2 on theories and models of giftedness).

Differential approach to giftedness research

Expertise research

Over the last 4 decades, *expertise research* has added another approach to explaining exceptional achievement. In contrast to differential approaches, expertise research rejects the idea that differences in intelligence are the root cause of exceptional performance. Instead, it sees exceptional achievement as being the result of intensive and long-term processes of learning and practice. Expertise, here, is usually intended to signify a particularly rich, subject- and task-specific knowledge, as well as a highly subject-specific problem-solving ability, which allows a person to achieve above-average performance in their domain of expertise on a sustained basis. In other words, it is about particularly high achievement *in a very specific domain*, such as, for instance, mathematics, chess, or inorganic chemistry.

The differential approach to giftedness and expertise research address the phenomenon of exceptional achievement from two different directions (see Figure 1). The differential approach is, as it were, a forward-looking approach. It aims to identify predictors of exceptional performance as early as possible and also explores how and under what conditions high potential actually develops into exceptional achievement. Thus, alongside individuals who perform at an exceptional level, a differential perspective is also interested in people who do not perform at a high level, but who have a high potential to do so. It is for this reason that intelligence plays such a prominent role in differential approaches to giftedness.

In contrast, expertise research is mainly a backward-looking approach. It is interested in experts, that is to say people who have already achieved exceptional performance. This means that this kind of research tends to retrospectively explore which personal prerequisites and developmental conditions led to and underpin exceptional performance. This is often done by comparing experts with novices in a particular domain (referred to as the expert–novice paradigm). As such, aspects of learning and practice are given a central role in expertise research.

The last few years have borne witness to an increasing integration of both approaches. At the end of the day, both differential approaches to giftedness and expertise research are interested in exceptional achievement and how it develops. A glance at the research results of both approaches shows that both differential approaches and expertise research have to be taken into account when trying to

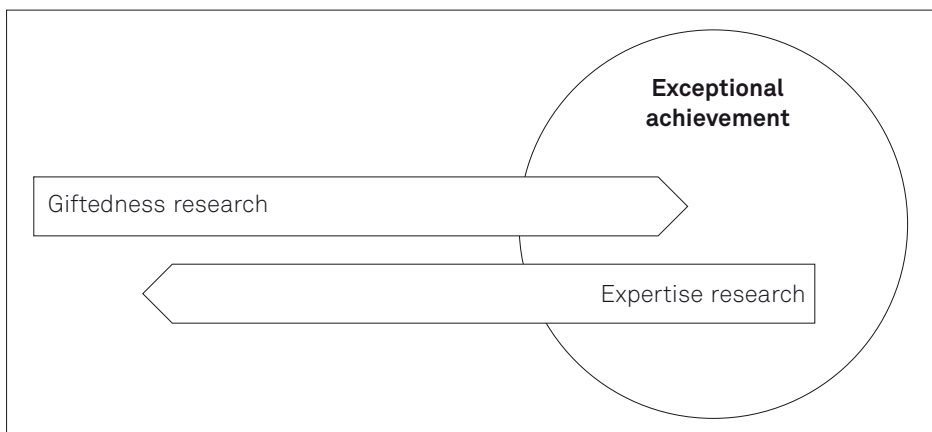


Figure 1. Starting points of differential giftedness research and expertise research

understand the development of exceptional achievement (Preckel et al., 2018; Subotnik et al., 2011). On the one hand, achievement development is related to one's achievement-related developmental potential but, on the other hand, this potential or giftedness does not automatically translate into exceptional achievement. It requires stimulation, instruction, and practice to develop.

1.2 Theories and Models of Giftedness and Exceptional Achievement

Older models of giftedness can clearly be assigned to the differential approach, whereas more recent models try to integrate the assumptions and findings of the differential approach with expertise research, which is more oriented on the psychology of cognition and learning. We therefore start this section with a brief description of expertise research before we go on to present the different models of giftedness.

1.2.1 Expertise

The term *expertise* means a specific aptitude in a certain domain and thus refers to having particularly rich knowledge in a specific domain and task-specific as well as area-specific problem-solving skills. These skills then enable a person to perform consistently at an above-average level in their area of expertise.

Expertise research explains skill acquisition and exceptional achievement in different areas or domains through similar developmental processes. The development of expertise can thus be understood as a continuous process of acquiring and consolidating domain-specific knowledge structures and skills. Processes of learning and practice are considered fundamental to this process, while differences in aptitude are believed to be negligible.

Some models of expertise acquisition posit a *sequence of developmental stages*, with the emphasis on the importance of an appropriate educational context. The Swedish psychologist K. Anders Ericsson and his colleagues (Ericsson, 1996; Ericsson et al., 1993) suggested the following sequence:

- In the first (early childhood) phase, there is a playful introduction to the relevant content area.
- The second phase is one of systematic practice, guided and supported by teachers. Here, the focus is on increasingly intensive and extensive instruction by very good teachers or trainers as the child grows.
- In the third phase, which generally takes place during adolescence, this instruction and guidance is further intensified. Support is provided by world-class coaches or highly skilled teachers, which then leads to exceptional achievement.

According to Ericsson et al., what essentially determines developmental progress and exceptional achievement is effort-focused and goal-oriented practice, which is known as *deliberate practice*. Deliberate practice does not involve simply

Expertise:
particularly
rich knowledge
and specific
problem-solving
skills in a
domain

**Stage model
of expertise
acquisition**

**Deliberate
practice**

practicing or repeating something but is instead a highly organized learning activity consistently aimed at improving one's knowledge and skills. The *quality of instruction* and pedagogical support provided by teachers is crucial here. For the process of acquiring expertise, learning needs to be structured in a meaningful way, and the learner's motivation has to be maintained. Deliberate practice is exhausting and can be quite frustrating, since one is constantly faced with what one does not yet know. Because of the time commitment required for deliberate practice, a good relationship and intensive cooperation between learner and teacher is absolutely essential. Thus, instruction and support cannot focus solely on the area of expertise but must take into account the learner in a holistic way. In addition to this, the learning environment and the learning process have to be compatible. It is for this reason that many children who want to participate in top-level sports, for instance, ask themselves at a certain age whether it makes sense for them to switch to a boarding school that specializes in their sport or continue their education via online classes.

10,000-hour rule

The American psychologist Benjamin Bloom (1985) studied the development of expertise in a variety of different domains, including art, music, science, and sport. He found, in all of these domains, that experts had spent a very long time learning their skills, eventually reaching peak performance after about 10 years of intensive training. The oft-cited *10,000-hour rule* is based on this research; the idea that those who have achieved expertise had practiced for at least 10,000 hours in their respective domain. Assuming that a person invests between 2.5 to 3 hours per day on practicing their skill, then this results in a period of around 10 years. This is why this rule is sometimes also referred to as the 10-year rule.

Contemporary research on deliberate practice, however, suggests that this is not a good heuristic for explaining high achievement. Depending on the field of performance, the amount of practice alone offers little to no explanation for individual differences in achievement (Hambrick et al., 2016; Macnamara et al., 2014; Macnamara et al., 2016). There are experts who have practiced significantly less than 10,000 hours and individuals who have practiced significantly more, without achieving expertise in their fields. This means that, in addition to the amount of practice someone does, there are other important factors that play a role in the acquisition of expertise:

- For a start, the quality of the practice and thus also the quality of instruction are key.
- Differences in the cognitive abilities of individuals are also significant. The higher someone's *cognitive ability*, the faster they learn and the greater the speed at which progress is achieved. This means that intellectually gifted children have a particularly high potential for acquiring expertise. This is illustrated by the so-called Matthew Effect. The Matthew Effect (derived from a verse in the Gospel according to Matthew: "For whoever has will be given more, and they will have an abundance. Whoever does not have, even what they have will be taken from them," NIV, Matthew 25:29; Biblica, 2023) states that someone with a well-developed intelligence, and thus capacity for learning, makes faster and greater progress in acquiring knowledge, with appropriate support, than someone with lower cognitive abilities. These advantages accumulate over time. Intelligence helps one acquire knowledge, and the more, and better, structured prior

**Giftedness:
potential for
acquiring
expertise**

knowledge there is, the easier learning comes. To add to this, one's cognitive abilities also appear to help one define the boundaries of one's developmental potential.

- *Personality* also plays an important role here. Ericsson et al. (1993) suggest that certain personal characteristics are particularly good at encouraging people to invest in their development in a way that makes it more likely that they will achieve expertise. Specific personality traits give people an aptitude for deliberate practice, which in turn leads to expertise. However, there is also evidence that personality has a direct influence on achievement (rather than just indirectly by making someone more likely to practice). The following personality traits are particularly relevant for achievement development: confidence in one's own ability to perform; perseverance and conscientiousness; achievement-related goals and values (in other words, a high level of personal aspiration and a regard for high achievement); good self-regulation; and a high motivation to achieve (Ziegler, 2004).
- *Starting age*, i.e., the age at which one begins to acquire expertise, also appears to be relevant to expertise acquisition. Different domains of achievement develop at different ages and over different lengths of time. For example, mathematical skills can develop as early as preschool age, whereas psychological expertise do not develop until much later – generally in adolescence and young adulthood (Subotnik et al., 2011). This means that starting age for instruction differs depending on the domain in question. And it would be oversimplistic to say that the rule is always “the earlier the better,” when it comes to acquiring expertise (e.g., Macnamara et al., 2016): The evidence here is in fact ambiguous. But it is possible that there are critical time windows in which the acquisition of some complex skills will be most successful. If these windows are missed, it will impede the positive development of one's achievement.
- It is also interesting to think about possible genetic factors. For example, some behavioral genetic studies found that the success of practice itself – i.e., the relationship between the amount of practice and one's achievement progress – could be partly explained genetically (Mosing et al., 2014).
- Finally, one must not forget that a child or individual has to be given the opportunity to engage with a given domain in the first place if they are going to acquire expertise in that domain. The specific environment and related opportunities, as well as the parental home, play a crucial role here.

The particular contribution of expertise research to the question of which factors determine exceptional achievement lies in its *emphasis on systematic instruction by good teachers*, as well as on practice and training. In addition, the expertise approach to exceptional achievement emphasizes the *importance of specialization* for achievement development, because expertise must be acquired in a particular domain rather than in general. No one questions the fact that exceptional performance in sport or music necessarily requires a focus on specific sports or instruments; the same is true for exceptional achievement in intellectual domains.

1.2.2 Models of Giftedness

As a complex phenomenon, giftedness requires a range of approaches

Giftedness as an open construct

There are numerous models of giftedness that are often quite different from one another. This is due to the fact that giftedness is a complex phenomenon that allows for and requires a variety of approaches. Giftedness, like all psychological variables, is a construct. That is to say, it is a theoretical concept, and thus not something that is directly observable. Giftedness must instead be inferred from observations of, for instance, a person's behavior in a given situation. As a rule, these situations are achievement based, i.e., situations in which one can delineate a set of criteria to define whether or not a certain action was successful. A multitude of possible achievement situations exists, and one cannot say conclusively which of these is and is not relevant to intellectual giftedness. Therefore, intellectual giftedness is an *open construct* that is constantly evolving. But, despite the variety of existing definitions and models, we can group most of them into the four broad directions, as illustrated in Figure 2.

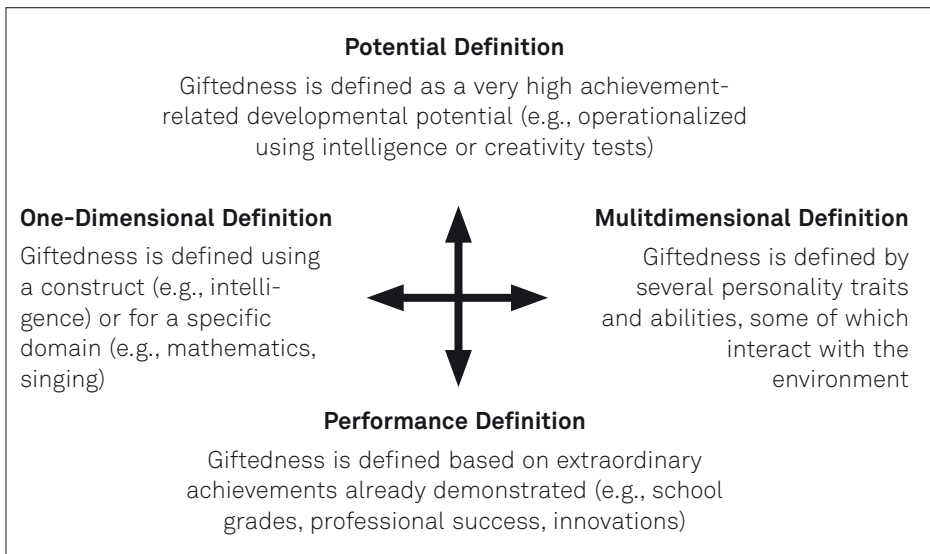


Figure 2. Classification grid of giftedness definitions (based on Preckel et al., 2018, p. 682)

We can also add *social definitions* or *labeling approaches to giftedness* to these four broad groupings. According to these approaches, a person is considered gifted if they have abilities that are valued by society or by certain people (other experts in the domain, for instance). Giftedness in these approaches is thus the result of a process of attribution.

Furthermore, we could add the distinction between *static* and *dynamic* definitions of giftedness to the groupings outlined in Figure 2. These definitions refer to whether giftedness is understood as more innate and stable, or whether one believes that a specific achievement-related potential develops or changes over time.

1.2.3 Performance Definitions Versus Potential Definitions

Performance definitions define giftedness in terms of exceptional achievement that has already been demonstrated. Therefore, they are sometimes referred to as *post hoc definitions*. Individuals in whom one sees a high potential for achievement that has not, however, manifested itself yet would, based on this definition, not be defined as gifted. *Potential definitions* of giftedness, on the other hand, define giftedness as a high potential for achievement, and do not equate it with achievement. According to this definition, anyone can be defined as gifted who shows a potential for high achievement – whether or not they exhibit it. Figure 3 illustrates the differences between these two definitions.

In Figure 3, potential is combined with environmental factors and other personality traits for both classes of definition. This combination is necessary whether or not giftedness is defined as observable achievement or as the potential for achievement. This is because potential does not manifest itself on its own; it does not develop in a vacuum but always interacts in a complex way with many other factors. Its development into achievement always comprises a complex interaction of environmental and personality factors in specific contexts. We will talk about this in more depth when we discuss multidimensional models of giftedness.

Interestingly, potential definitions are currently widely accepted when it comes to children and adolescents, while adults are nearly always evaluated using performance definitions. For example, there are almost no gifted programs for older students that would accept individuals who did not perform at a very high level. However, younger children are sometimes admitted to gifted classes even if their achievement in school is not excellent (because, for instance, they have achieved a high score in an intelligence test). Where does this age-related shift in giftedness definitions come from? If one considers, for example, the concept of lifelong learning, this shift does not appear to be well supported theoretically. Furthermore, there are individuals whose giftedness and abilities show up relatively late in life. Examples of late bloomers include the composer Anton Bruckner, the writer Charles

Performance definitions: giftedness as a high level of achievement

Potential definitions: giftedness as potential for high achievement

Age-related shift in giftedness definitions

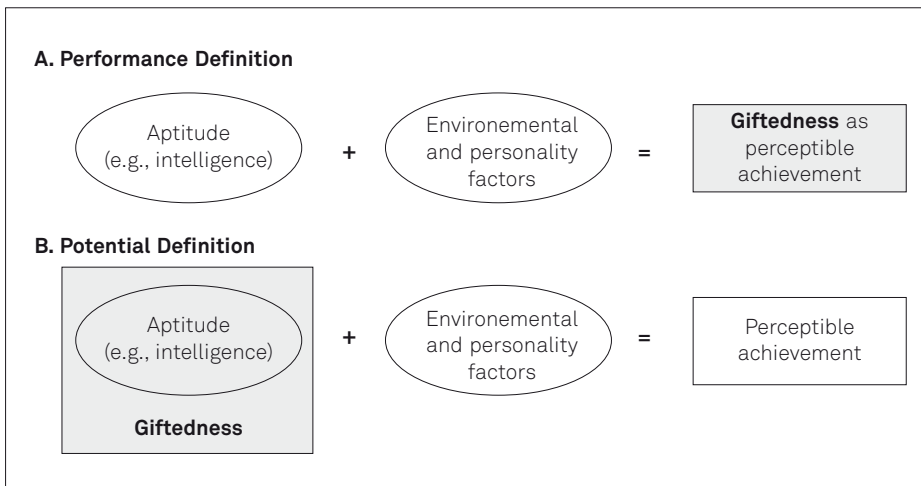


Figure 3. Basic concept of performance definitions (A) and potential definitions of giftedness (B) (based on Holling & Kanning, 1999, p. 6 f.)

Bukowski, and the painter Grandma Moses. Bruckner, for example, did not write his first composition until he was in his late 30s, Bukowski published his first novella at the age of almost 50, and Grandma Moses did not begin painting until she was in her seventh decade. But, in general, these kinds of case histories are relatively rare.

Potential definitions imply that if personal and environmental conditions are favorable, then potential will translate into achievement. Favorable environmental conditions might be, for instance, appropriate external support and opportunities. The question arises then as to whether this support might have no (or only a minor) effect at certain stages of development. It is possible that there are certain successive stages in the development of achievement that are related to age, or a critical window of time for the development of certain complex skills. Another factor here is that most societies see themselves as having a social responsibility to educate and support younger people. But in adulthood the responsibility lies with the person themselves. These different points explain in part, but not completely, why potential definitions are dominant when talking about giftedness in younger people and why performance definitions are dominant for adults.

1.2.4 Unidimensional Definitions

Unidimensional definitions were, historically, the most traditional way of defining giftedness. As mentioned in Section 1.1, at the end of the nineteenth century Sir Francis Galton equated high ability with high intelligence. The intelligence-based or IQ definition of giftedness is still widely used today in academic and real-world settings to identify and support intellectually gifted individuals. Often a certain threshold value is used, above which one speaks of intellectual giftedness (for instance, an IQ of 130 or above, or a percentile rank of 98 or above). For this reason, this definition is also called a *psychometric definition* of giftedness. Often, intelligence is equated with Spearman's general factor of intelligence, the so-called *g*-factor. Sometimes, however, different dimensions of intelligence are distinguished (e.g., verbal or mathematical intelligence), so that different types of intellectually gifted individuals can be grouped together (e.g., generally gifted individuals, mathematically gifted individuals).

Critiques of unidimensional definitions

Unidimensional definitions count as a differential approach to giftedness research (see Figure 1). They can be formulated both as potential definitions and as performance definitions. If, for example, a test subject has a percentile rank of 98 in a test of numerical intelligence and is consequently regarded as mathematically gifted, then this is a potential definition. If, on the other hand, the winners of the International Mathematics Olympiad are considered to be gifted in mathematics, this is a performance definition.

There have, however, been a number of criticisms of unidimensional definitions of giftedness. As already mentioned, giftedness can be verified in different domains of activity – not just as an intellectual gift. From the point of view of educational policy, limiting the concept of giftedness to the intellectual sphere by means of the intelligence criterion runs the risk of overlooking existing potential in other areas. The definition offered by the Marland Report, mentioned in Section 1.1 (the

so-called Marland definition), lists six areas of giftedness. But even if one just focuses on intellectual giftedness, we can still criticize these unidimensional models. Although intelligence is one of the best predictors of success at school and in professional life (see Chapter 4), intelligence tests are only moderately good at predicting exceptional performance. This is because achievement or exceptional performance is never rooted in just one thing; it is always multifactorial. It therefore makes complete sense to conceptualize giftedness as an extremely high achievement-related development potential that is also multidimensional.

1.2.5 Multidimensional Definitions and Models

Multidimensional definitions of giftedness cite other factors in addition to intelligence, such as creativity or musicality. As such, these models take into account the fact that giftedness can be found in different areas and that, accordingly, exceptional achievement can be achieved in different fields (e.g., art, technology, business). Multidimensional models of giftedness also assume that the causes of exceptional performance can vary widely across individuals. Some of these models also attempt to describe, more comprehensively, the process of *achievement development*. This process in which potential develops into performance can be called talent development.

Talent development: process in which potential develops into performance

Multidimensional models identify a range of different factors that influence how or whether potential translates into achievement. These include personality and environmental characteristics (such as achievement motivation, learning environment) or processes of practice. We will now outline a few examples of these different models.

Renzulli's Three-Ring Model

One of the first multidimensional models of giftedness was developed by the American educational psychologist Joseph Renzulli at the end of the 1970s (Renzulli, 1978; see Figure 4). In this model, giftedness occurs at the intersection of three personal characteristics: above-average intellectual abilities; task commitment (in the sense of achievement motivation, perseverance, self-regulatory abilities); and creativity as an original, productive, flexible, and individually independent approach to the task.

Giftedness as the intersection of ability, task commitment, and creativity

Although the constructs in Renzulli's model belong to the differential approach to giftedness research, Renzulli developed it with the intention of depicting a more developmentally oriented position. According to Renzulli, a person is not born gifted, but develops gifted behaviors when the three personal characteristics mentioned above combine. To describe someone as gifted, it thus follows that all three constructs have to be measured when giftedness is being assessed based on this model. Intelligence tests alone are consequently not sufficient.

The question arises, however, of whether all three constructs really do have to be above average. For Renzulli, for example, creativity is a key factor. He distinguishes between *schoolhouse giftedness* and *creative-productive giftedness*. Individuals who are

According to Renzulli, we develop gifted behaviors

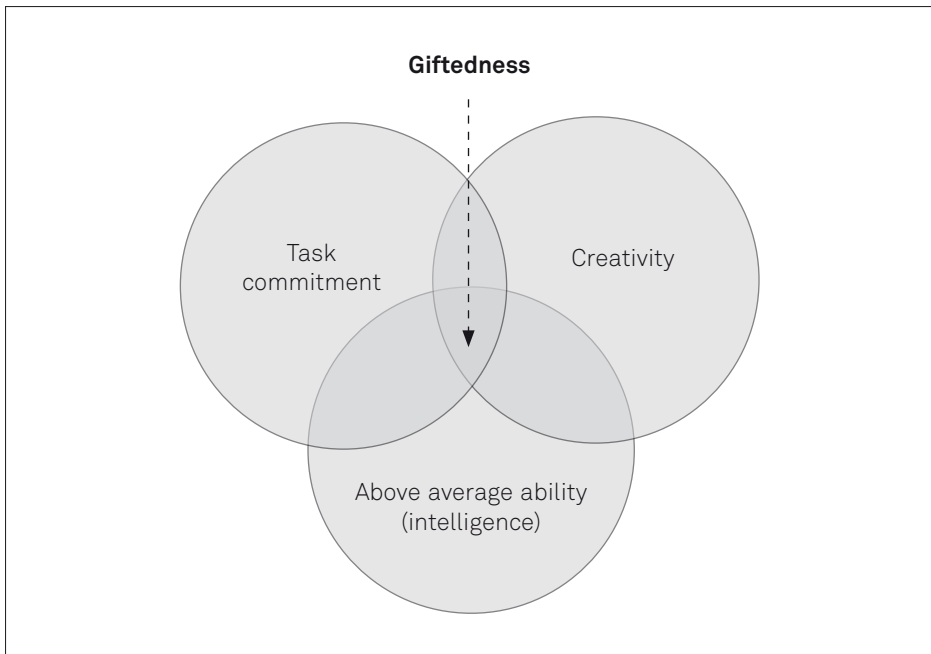


Figure 4. Renzulli's three-ring model of giftedness (1978)

schoolhouse gifted have above-average ability and motivation, while those who are creative-productive gifted are also creative. The former primarily reproduce knowledge, while the latter create new knowledge. In making this distinction, Renzulli thus indirectly introduces a value judgment on different forms of giftedness, which is ethically questionable and cannot be established empirically (we will come back to the connection between intelligence and creativity in Section 1.4.3). To add to this, it is also the case that the number of potentially gifted people continuously decreases the more characteristics are assigned as necessary conditions of giftedness. In other words, the probability that two or three characteristics apply to a person is lower than the probability that only one characteristic applies. This was certainly not Renzulli's intention when he developed his model. His predominant goal was to identify as many gifted individuals as possible and promote giftedness in the form of creative productivity (e.g., Renzulli & Reis, 2018). By including motivational and creative variables, Renzulli significantly expanded the range of possible starting points for interventions, and his model is still often used in real-world scenarios today. The popularity of the model is probably due to its (ostensible) simplicity. From a scientific point of view, however, there are some significant criticisms:

- The role of creativity is unclear and contentious, as is his distinction between schoolhouse giftedness and creative-productive giftedness.
- The empirical testability of the model is hampered by the fact that the model's specific mechanisms of action and interaction remain open. Can the three constructs cancel each other out? Can, for instance, lower creativity be compensated for by a high commitment to the task at hand? Are there minimum characteristics for personal traits? The model does not offer answers to these questions.

- If, in fact, someone does have to be above average in all three areas, then many individuals will fall through the cracks (e.g., highly creative and capable individuals with no task commitment).
- The model neglects environmental factors. In response to this gap, Mönks and Mason (1993) added the environmental factors of family, school, and peer groups to Renzulli's model, emphasizing that the three personal characteristics can only develop positively in a favorable learning environment. They call their model the enrichment triad model of giftedness.

Gagné's Differentiated Model of Giftedness and Talent

The Canadian researcher Francois Gagné (1993) criticized Renzulli's model for not differentiating between potential and achievement, or rather giftedness and achievement. In his model of giftedness and talent (see Figure 5), therefore, Gagné distinguishes between natural abilities or aptitudes and developed abilities, talents, or competences (Gagné, 2015).

Gagné understands aptitudes as being abilities that have not yet been developed, and which can be found in very varied domains. According to Gagné, talents are rooted in genetics, but are not innate. They develop primarily in childhood through maturation processes and informal practice, and are dependent on how much stimulation and support a child receives. In Gagné's view, one's genetic makeup defines the limits of one's possible development (Gagné, 2015). Gagné considers gifted people to be those whose natural abilities or aptitudes in a given domain would be ranked within the top 10% of their age group.

Gagné defines talent as what we would refer to as performance, i.e., systematically developed abilities that make people experts in a particular field. Because of how distinct talents can be, the areas in which talent can manifest itself are necessarily very diverse. For this reason, the model is also known as the differentiated model of giftedness and talent. In this model, again, talented people are those who are in the top 10% of a given area of achievement.

Unlike Renzulli's model, Gagné considers creativity to be a separate area of aptitude and talent. For Gagné, not all talent development is dependent on creativity. In addition to intellectual-cognitive ability and creativity, he lists a range of other areas of giftedness, such as social giftedness and special perceptual abilities (for instance, a highly pronounced ability to be able to discern between different smells). His model is, however, explicitly open to development.

Gagné also outlines the process of how talent or performance develops. Talent or performance arises when a person invests their abilities in a specific area of activity, i.e., by building up knowledge and skills through systematic learning, practice, and training. In terms of its content, this process of development can be described via the activities undertaken by the learner (At what stage can people access content? What content do they have access to? Did they develop this content themselves, or was it created in advance? etc.). The Gagné model also emphasizes the importance of how much time, energy, and resources are invested in the development of talent (How often do people practice and what is the quality of this

Distinction between aptitudes and talents

Gifted individuals: individuals whose aptitudes rank in the top 10%

Talent is the result of someone investing their abilities in a particular area of activity

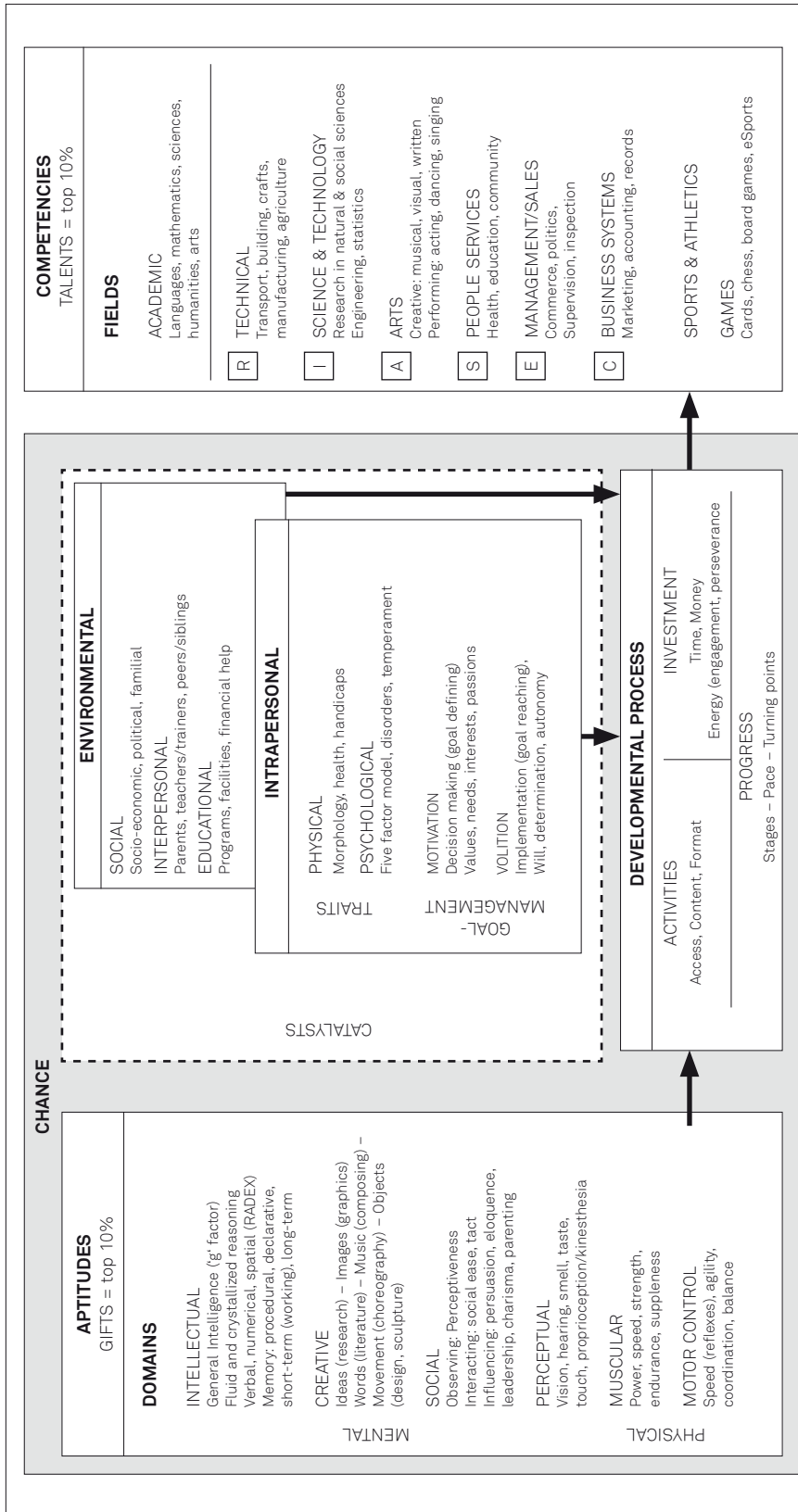


Figure 5. Differentiated model of giftedness and talent (DMGT); adapted from Gagné, 2020)