

# gesis

Leibniz-Institut  
für Sozialwissenschaften



## Welche sozio-emotionalen Fähigkeiten tragen zum Bildungserfolg bei – und wie groß ist ihr Einfluss?

Forum I:  
Relevanz sozio-emotionaler Fähigkeiten  
für Bildungsverläufe und Bildungserfolg  
Dr. Clemens Lechner

Mitglied der

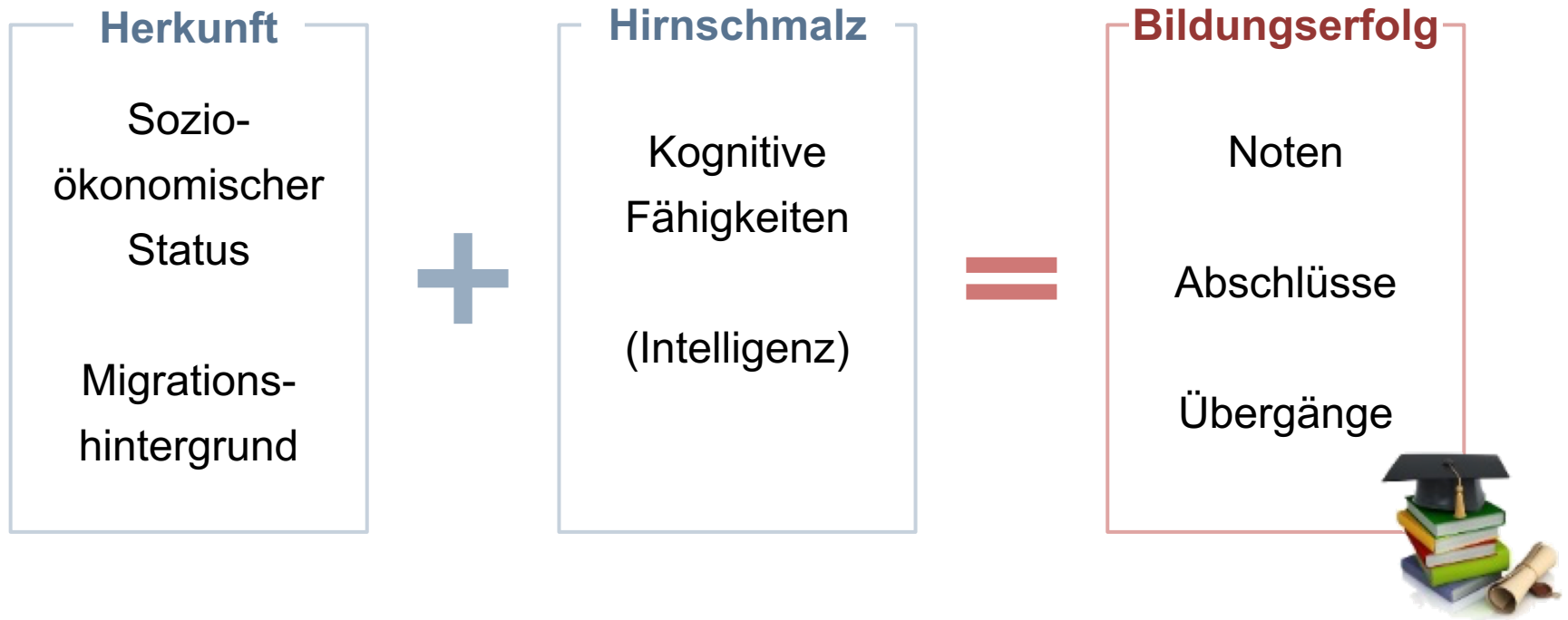
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# Was macht gute SchülerInnen aus?



# Der Bildungserfolg hängt stark von sozialer Herkunft und kognitiven Fähigkeiten ab



# Sozio-emotionale Fähigkeiten sind ein breiter Sammelbegriff für nicht-kognitive Fähigkeiten



## Sozio-emotionale Fähigkeiten

- relativ stabil
- prinzipiell veränderbar
- positive Konsequenzen
- nicht von Intelligenztests erfasst

## Unsere Studien basieren auf Daten aus dem nationalen Bildungspanel (NEPS)

### Stichproben

- Mehrere Startkohorten (Altersbereiche)
- Tausende Studienteilnehmende
- Repräsentativ für den jeweiligen Altersbereich



### Maße

- Schulleistung
  - Noten
  - Leistungstests
- Kognitive Fähigkeiten
  - Schlussfolgerndes Denken
  - Verarbeitungsgeschwindigkeit
- Sozio-emotionale Fähigkeiten
  - Persönlichkeit
  - Interessen uvm.

# Im Folgenden lassen wir Persönlichkeit und Interessen gegen kognitiven Fähigkeiten antreten

## Persönlichkeit

### Gewissenhaftigkeit



FACETTE

Ordnungsliebe  
Verlässlichkeit  
Leistungsstreben

### Offenheit für Erfahrungen



FACETTE

Intellektuelle Neugierde  
Einfallsreichtum  
Ästhetische Sensitivität

### Emotionale Stabilität



FACETTE

Ausgeglichenheit  
Belastbarkeit  
Optimismus

### Extraversion



FACETTE

Geselligkeit  
Durchsetzungsstärke  
Energie

### Verträglichkeit



FACETTE

Mitgefühl  
Höflichkeit  
Vertrauen

## Interesse



an Mathe  
am Lesen

## Kognitive Fähigk.

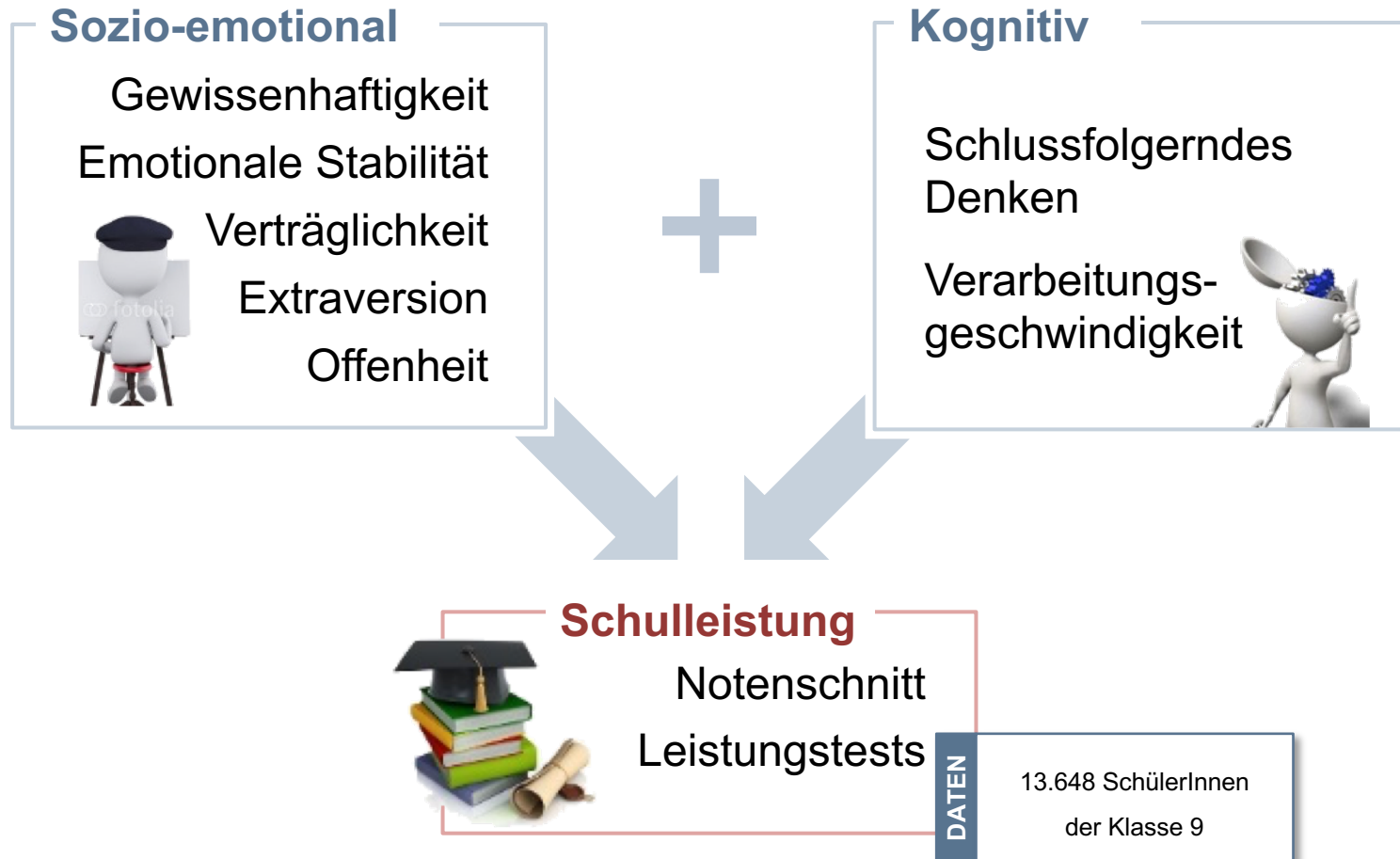
Schlussfolgern  
Verarbeitungsgeschwindigkeit



Wie relevant sind  
sozio-emotionale Fähigkeiten  
für die Schulleistung –  
**und welche Fähigkeiten  
sind am wichtigsten?**



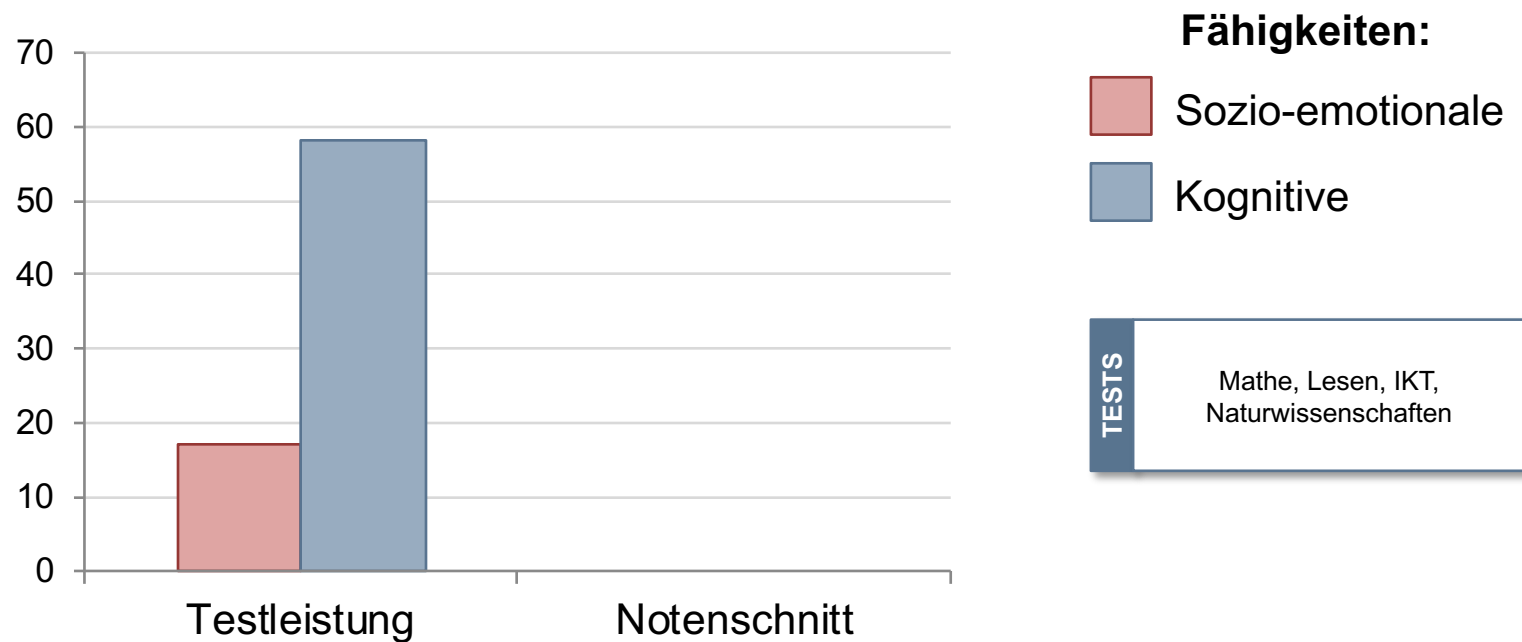
# Wir haben untersucht, welche Fähigkeiten die Schulleistung in Klasse 9 widerspiegelt





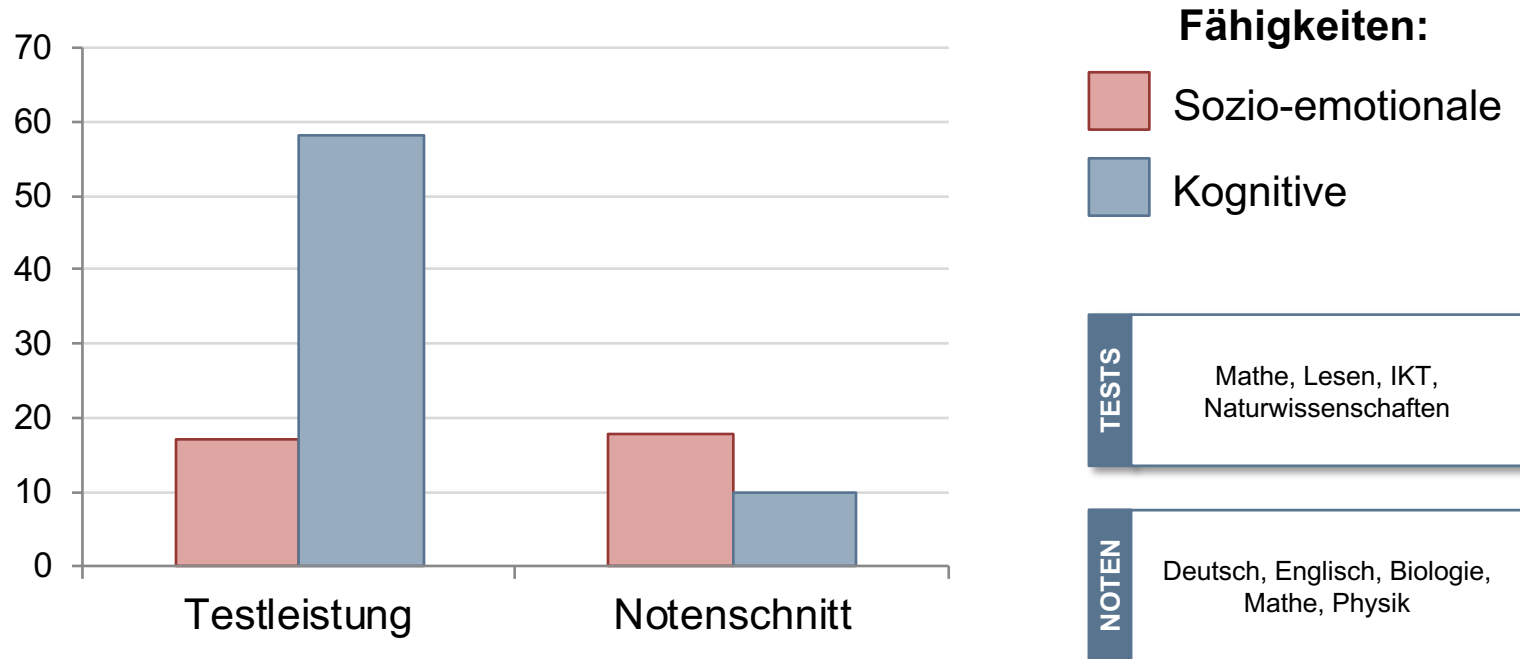
# Sozio-emotionale Fähigkeiten erklären Unterschiede in der Schulleistung

Erklärte Leistungsunterschiede (%)



# Sozio-emotionale Fähigkeiten erklären Unterschiede in der Schulleistung

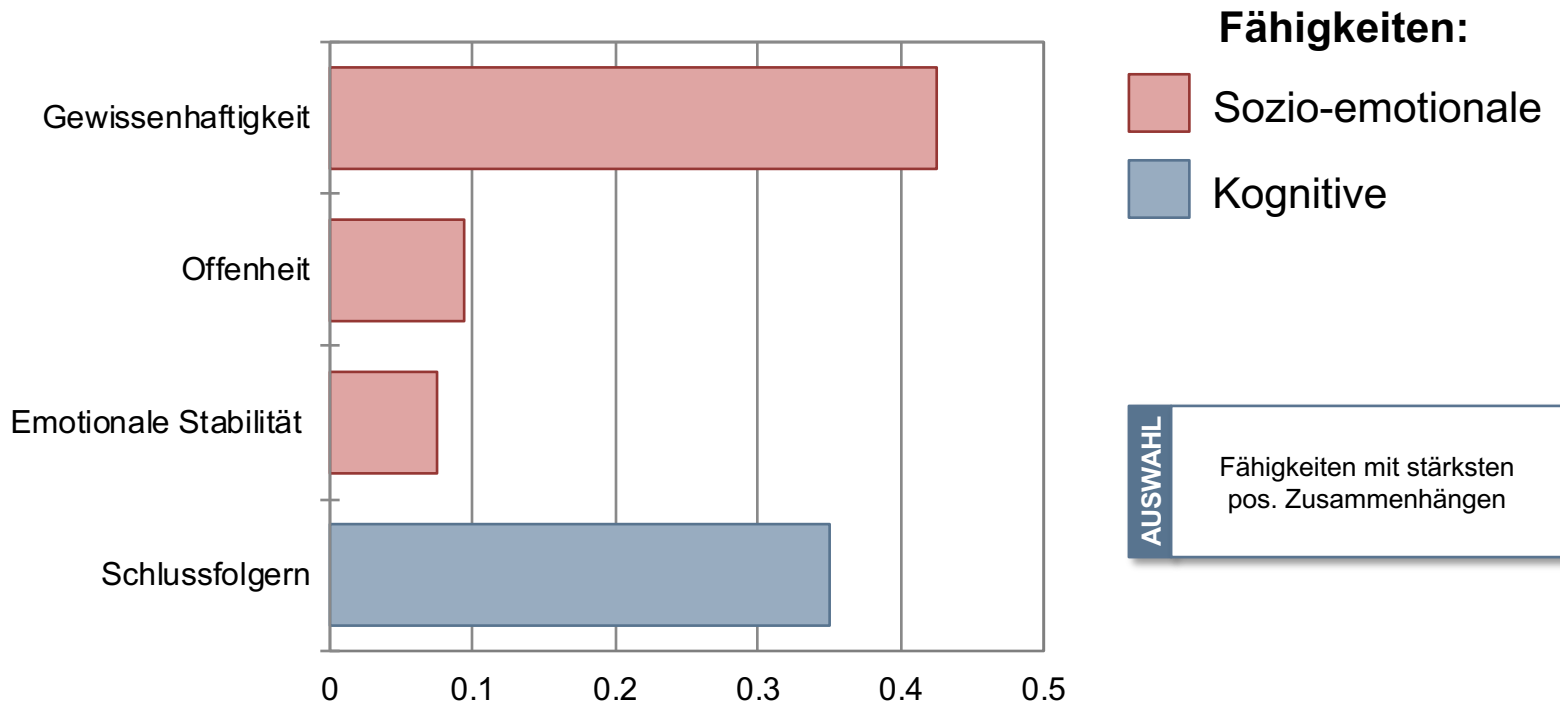
Erklärte Leistungsunterschiede (%)




**SIEHE** Vgl. auch Borghans und Kollegen, 2016, <http://doi.org/10.1073/pnas.1601135113>

# Für den Notenschnitt zählt vor allem Gewissenhaftigkeit

## Zusammenhänge mit Noten



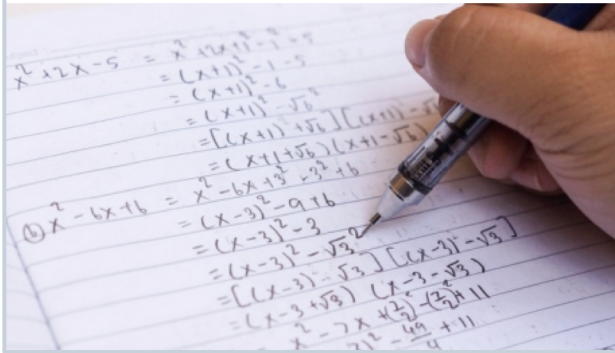
Wie relevant sind  
sozio-emotionale Faktoren  
**für Noten in Schulfächern**  
**und verschiedenen Schulformen?**



# Sind sozio-emotionale Fähigkeiten in verschiedenen Schulfächern und Schulformen relevant?

## Schulfächer

Mathematik  
Deutsch / Lesen



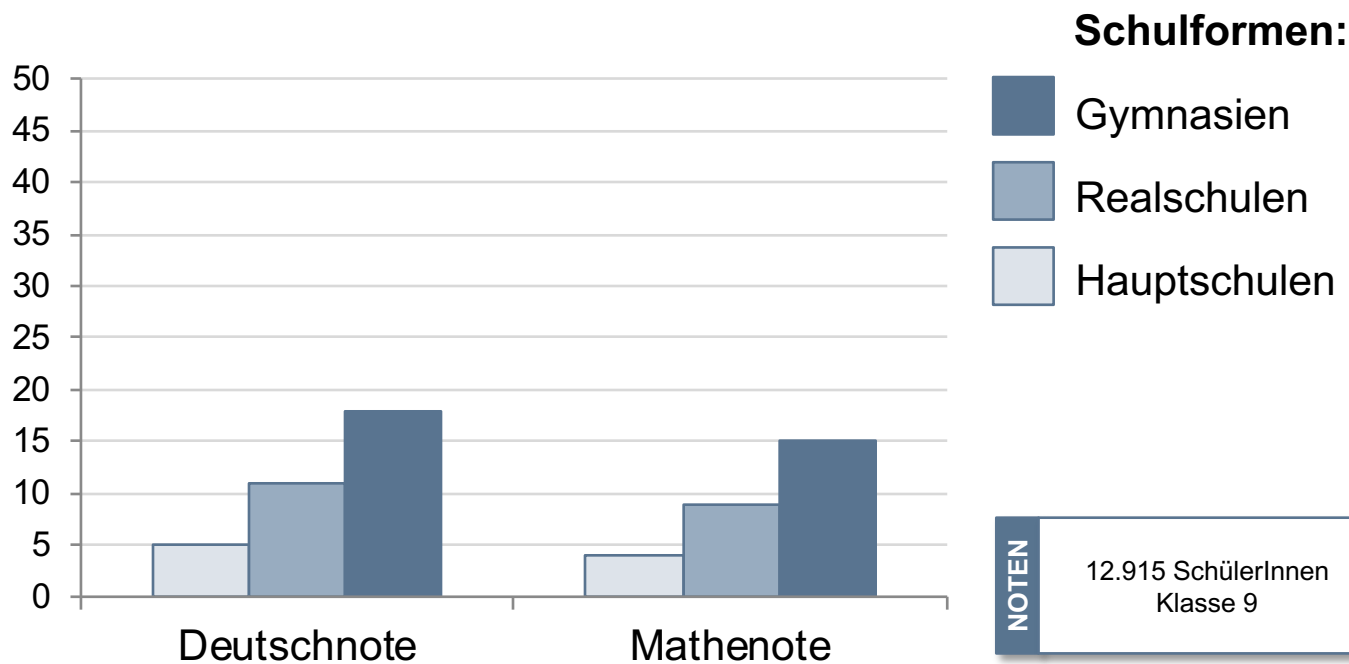
## Schulformen

Gymnasium  
Realschule / Mittelschule  
Hauptschule



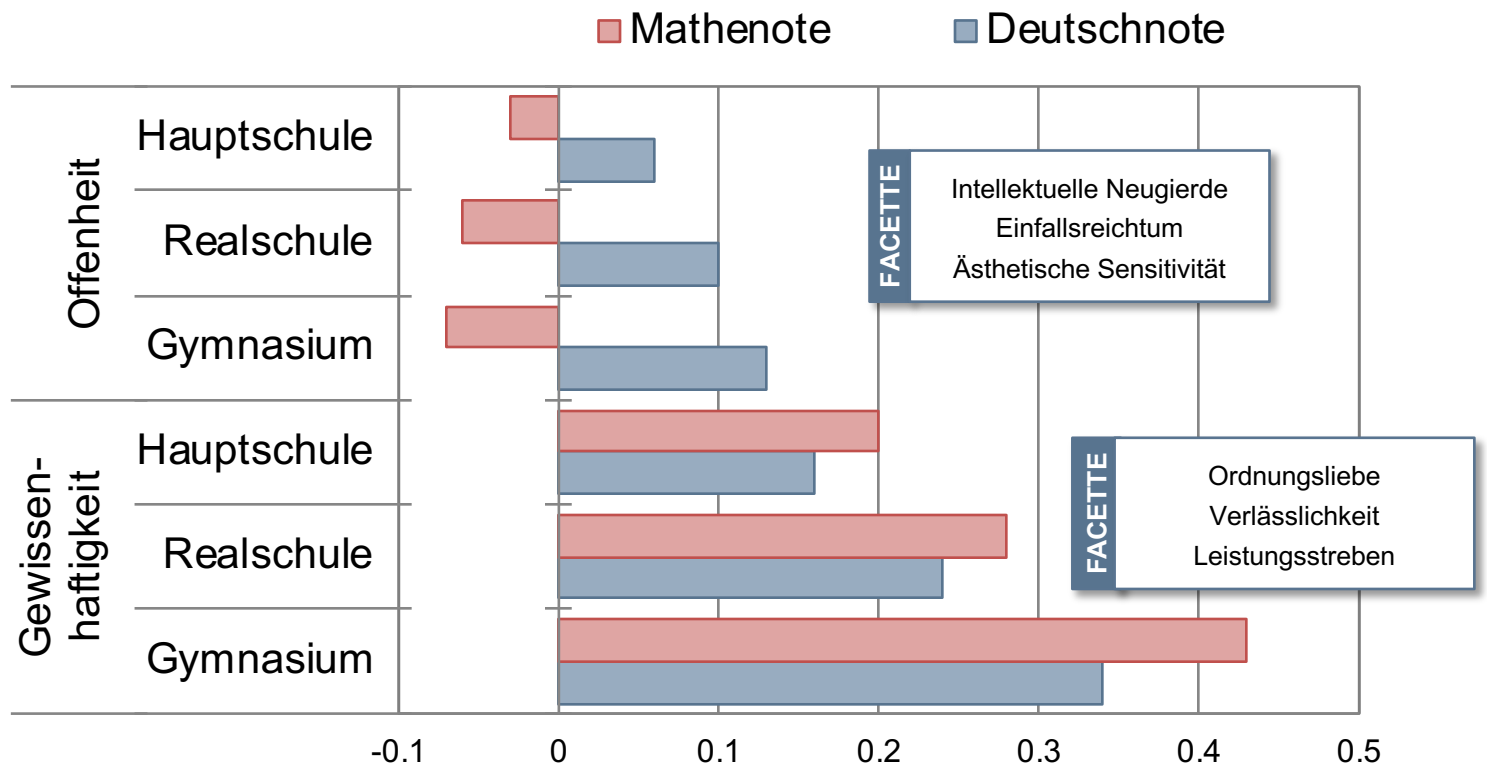
# Sozio-emotionale Fähigkeiten sind für Deutsch- und Mathenoten etwa gleich wichtig

Erklärter Anteil an Noten (%)



# Die Stärke vieler Zusammenhänge schwankt über Fächer und Schulformen – Gewissenhaftigkeit zahlt sich für Noten immer aus

## Zusammenhänge mit Noten

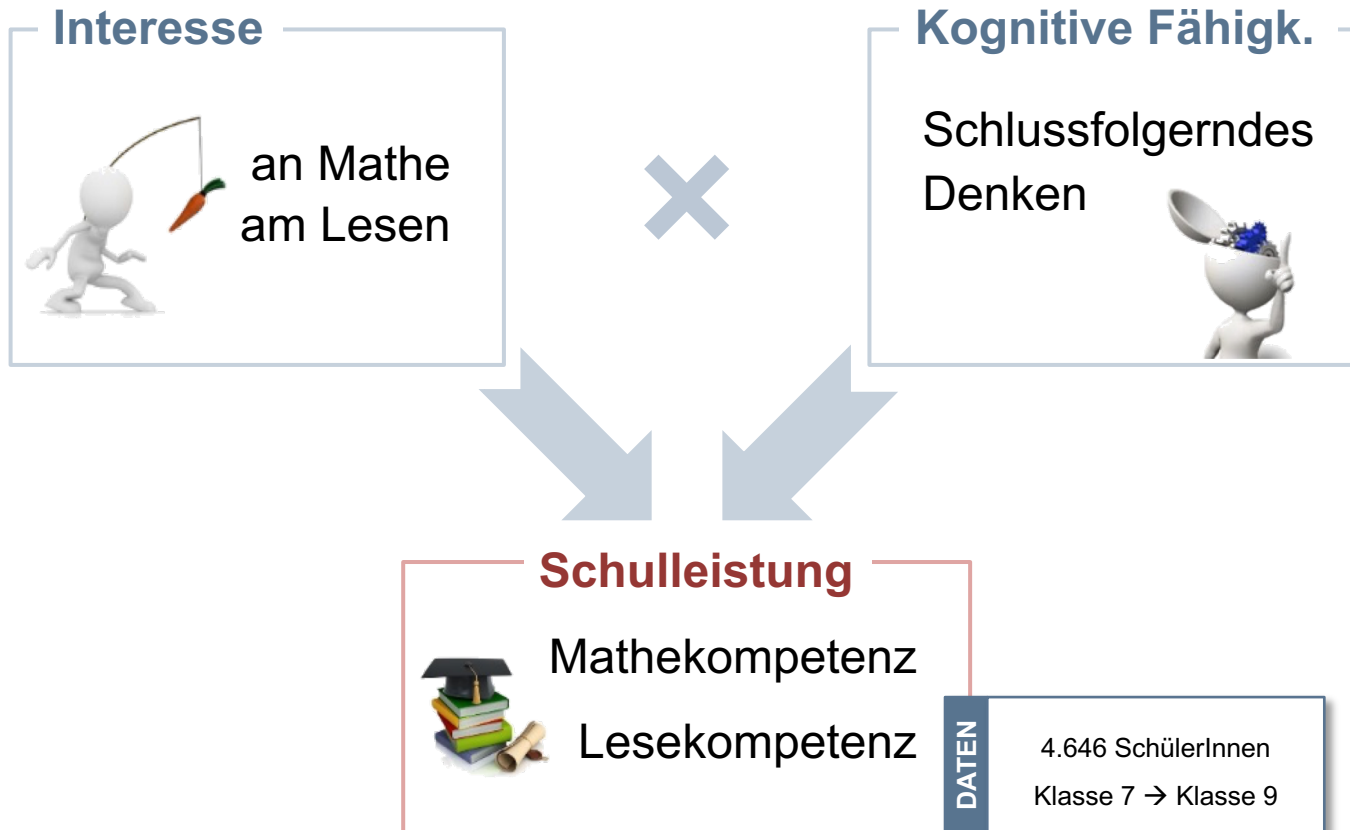


Wie wirken sozio-emotionale  
Fähigkeiten (hier Interesse)  
**und kognitive Fähigkeiten  
zusammen?**



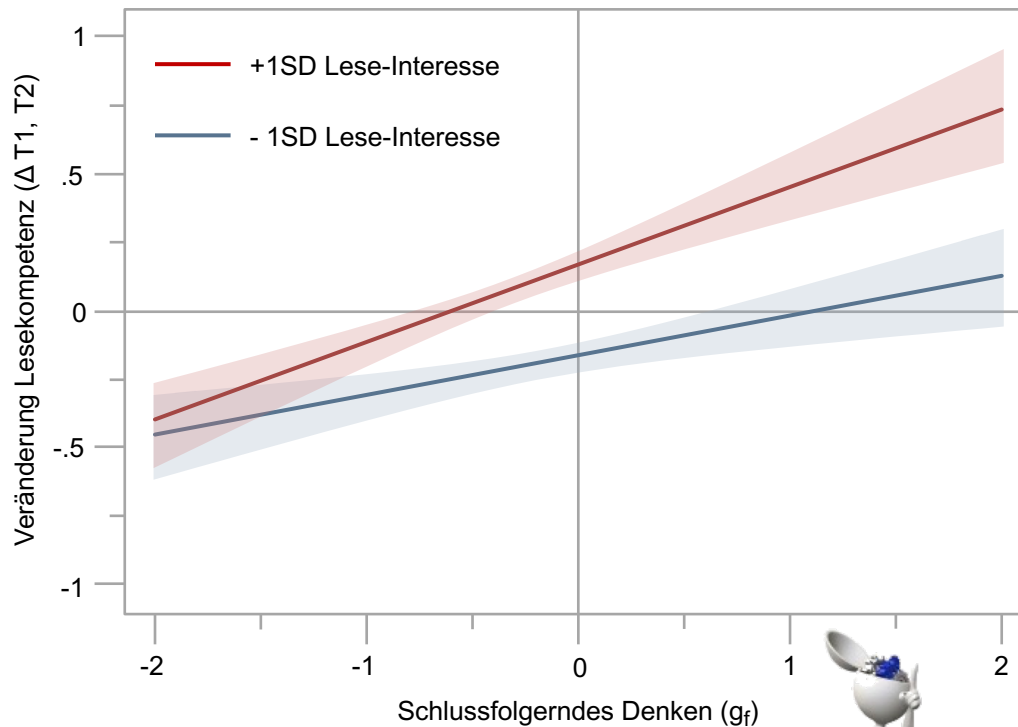


# Wir haben untersucht, wie fachliches Interesse und kognitive Fähigkeiten zusammenwirken



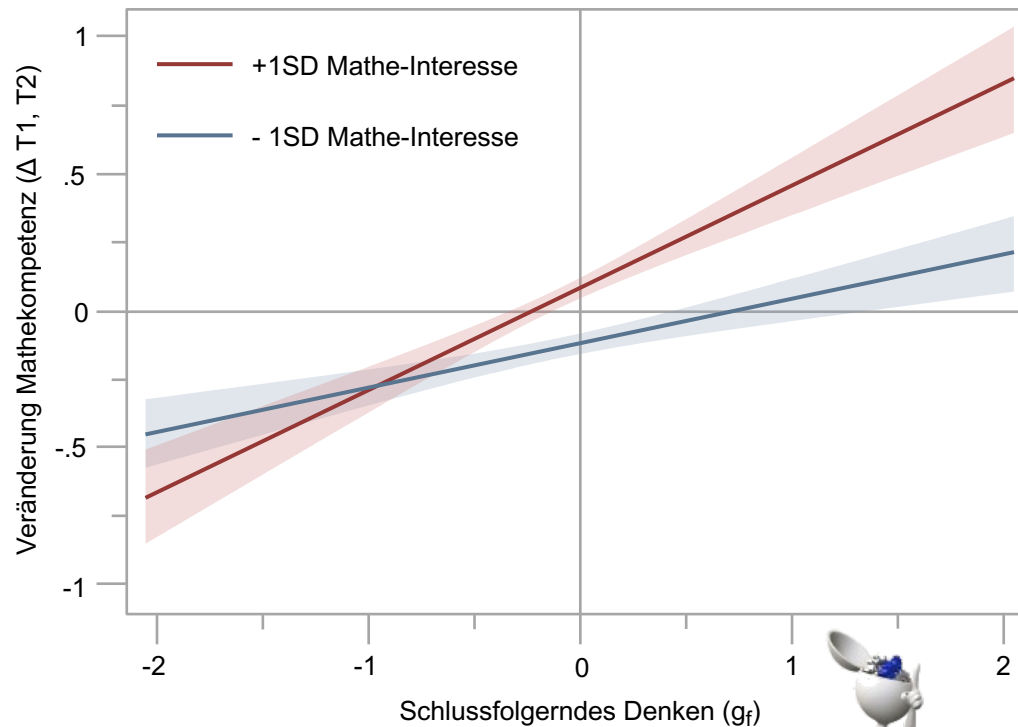
# Fachliches Interesse und kognitive Fähigkeiten befruchten sich gegenseitig: Beispiel Lesen

## Zuwachs der Lesekompetenz



# Fachliches Interesse und kognitive Fähigkeiten befruchten sich gegenseitig: Beispiel Mathematik

## Zuwachs der Mathekompetenz



# Was macht gute SchülerInnen aus?



# Wie relevant sind sozio-emotionale Fähigkeiten für die Schulleistung – und welche Fähigkeiten sind am wichtigsten?

## Sozio-emotionale Fähigkeiten

Sozio-emotionale Fähigkeiten erklären in Klasse 9  
17–18% der Unterschiede in der Schulleistung

Für Noten sind sie wichtiger als kognitive Fähigkeiten

Gewissenhaftigkeit erweist sich als wichtigste Fähigkeit



# Die Ergebnisse wurden in Personality and Individual Differences veröffentlicht


## Originalarbeit

Lechner, C. M., Danner, D.,  
Rammstedt, B. (2017).  
How is personality related to  
intelligence and achievement? A  
replication and extension of  
Borghans et al. and Salkever.  
*Personality and Individual  
Differences, 111, 86–91.*

[https://doi.org/10.1016/  
j.paid.2017.01.040](https://doi.org/10.1016/j.paid.2017.01.040)


Personality and Individual Differences 111 (2017) 86–91

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journal homepage: [www.elsevier.com/locate/paid](http://www.elsevier.com/locate/paid)



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**How is personality related to intelligence and achievement? A replication and extension of Borghans et al. and Salkever** 

Clemens Lechner\*, Daniel Danner, Beatrice Rammstedt

GESIS – Leibniz Institute for the Social Sciences, Mannheim, Germany

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ARTICLE INFO	ABSTRACT
<p><b>Article history:</b> Received 6 September 2016 Received in revised form 17 January 2017 Accepted 23 January 2017 Available online xxx</p> <p><b>Keywords:</b> Intelligence Achievement Grades Ability Personality Non-cognitive skills Identification problem</p>	<p>In two equally enlightening contributions on identification problems in personality psychology, Borghans, Galseng, Heckman, and Humphrey (2011) and Salkever (2015) discussed two questions with potentially far-reaching implications for studies on the effects of cognitive ability on important life outcomes: (1) whether measures of “achievement” and “intelligence” are distinct; (2) and to what extent achievement measures are confounded with personality traits. In the present article, we revisit this controversy, identify unresolved issues, and provide a fresh look at the key questions. Our independent replication and extension using a large representative sample of German ninth-grade students (<math>N = 13,668</math>) demonstrates that achievement and intelligence tests are highly but not perfectly correlated. Personality accounts for a substantial share of the variance in achievement but only a small share of that in intelligence. Importantly, personality incrementally explains variance in achievement above and beyond intelligence. Whereas standardized achievement measures are a good (but not “pure”) indicator of cognitive ability, this problem of confounding is particularly pressing for school grades, which are only modestly correlated with intelligence and highly laden with personality. We discuss theoretical implications and recommend that studies aiming to identify the effects of cognitive ability on life outcomes routinely control for personality.</p> <p style="text-align: right; font-size: x-small;">© 2017 Elsevier Ltd. All rights reserved.</p>
<p><b>1. Introduction</b></p> <p>How are cognitive ability<sup>1</sup> and personality<sup>2</sup> related? This question is important in its own right and has recently attracted renewed attention (Chamorro-Premuzic &amp; Furnham, 2005; Rammstedt, Danner, &amp; Lechner, 2017). Yet it is also at the core of a more specific debate (Borghans et al., 2011; Salkever, 2015) revolving around the question to what extent measures of learned skills, such as standardized achievement tests or</p>	<p>school grades, reflect basic cognitive skills—often termed “intelligence” or “IQ”—or, instead, personality traits such as the Big Five. The present study provides a fresh look at this question, using a large and representative sample of ninth-graders from the German National Educational Panel Study (NEPS).</p> <p><i>1.1. The original argument</i></p> <p>In an instructive article, Borghans et al. (2011) delineated what they called a “fundamental identification problem in personality psychology” (p. 319) that arises from the practice of equating measures of traits with the traits themselves. The authors criticized this practice as unwarranted because measures of traits arise from multiple sources other than the traits they intend to measure. As a case in point, Borghans et al. discussed standardized achievement tests and school grades. They argued that such achievement measures, often taken to measure intelligence, reflect more than cognitive ability—namely, also personality traits. In their view, achievement measures cannot be used to identify effects of intelligence on outcomes of interest.</p> <p>The authors corroborated their arguments with empirical analyses in two samples: a representative sample of American youth (the National Longitudinal Survey of Youth, NLSY79, <math>N = 12,686</math>) and a smaller Dutch high school sample (Stella Maris, <math>N = 374</math>). In both samples, achievement test scores and school grades showed far-from-perfect</p>

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E-mail address: [clemens.lechner@gesis.org](mailto:clemens.lechner@gesis.org) (C. Lechner).

<sup>1</sup> The literature uses a multitude of terms such as achievement, ability, aptitude, cognition, intelligence, and IQ rather loosely. The main distinction that Borghans et al. make is that between achievement and intelligence (or IQ). They use the term ‘intelligence tests’ for tests primarily measuring fluid intelligence (g) and ‘achievement tests’ for tests primarily measuring crystallized intelligence (g<sub>c</sub>). Although these choices may be debated, we follow this terminology throughout this article (as Salkever, 2015, did) for consistency. For, like Borghans et al., we reserve the term ‘achievement’ for standardized achievement tests and school grades, which measure learned abilities essential for life in modern societies and come closest to the definition of g<sub>c</sub>. Second, we use the term ‘intelligence’ to denote relatively ‘pure’ measures of basic cognitive ability that fit the definition of g.

<sup>2</sup> The recent economic literature collectively refers to personality traits such as the Big Five as “non-cognitive skills”. This does justice to the fact that these personality traits can be viewed as “soft skills” beyond cognitive ability that have well-established effects on a range of life outcomes.

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# Wie relevant sind sozio-emotionale Fähigkeiten für Noten in verschiedenen Schulfächern und Schulformen?

## Big Five in Klasse 9

Relevanz der Big Five für Schulleistung:

- in Deutsch und Mathe etwa gleich hoch
- auf dem Gymnasium höher als auf anderen Schulformen



Einzelne Zusammenhänge :

- Schwanken über Schulform, Schulfach, oder beides
- Zusammenhänge von Gewissenhaftigkeit mit Noten sind recht robust



# Die Ergebnisse wurden im Journal of Personality veröffentlicht

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ORIGINAL ARTICLE WILEY

## Personality, cognitive ability, and academic performance: Differential associations across school subjects and school tracks

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**Abstract**  
**Aim:** Personality traits and cognitive ability are well-established predictors of academic performance. Yet, how consistent and generalizable are the associations between personality, cognitive ability, and performance? Building on theoretical arguments that trait–performance relations should vary depending on the demands and opportunities for trait expression in the learning environment, we investigated whether the associations of personality (Big Five) and cognitive ability (fluid intelligence) with academic performance (grades and tests scores) vary across school subjects (German and math) and across ability-grouped school tracks (academic, intermediate, and vocational).  
**Method:** Multiple group structural equation models in a large representative sample of ninth-grade students ( $N = 12,915$ ) from the German National Educational Panel Study (NEPS).  
**Results:** Differential associations across school subjects emerged for cognitive ability, Emotional Stability, and Conscientiousness (math > German); and for Openness and Extraversion (German > math). Differential associations across school tracks emerged for cognitive ability, Conscientiousness (academic > intermediate > vocational) and Agreeableness (academic > intermediate > vocational). Personality traits explained more variation in academic performance in the academic than in the other tracks.  
**Conclusion:** Most trait–performance relations varied across subjects, tracks, or both. These findings highlight the need for more nuanced and context-minded perspective on trait–performance relations.

**KEYWORDS**  
achievement, cognitive ability, education, personality, trait activation theory

**1 | INTRODUCTION**

Who succeeds at school? Traditionally, cognitive ability is seen as the key predictor of learning and academic performance (Deary, Strand, Smith, & Fernandes, 2007; Kuncel, Hezlett, & Ones, 2004; Roth et al., 2015). More recent evidence shows that a range of traits that are often summarized as “non-cognitive” or “socio-emotional” skills play an equally important role in shaping students’ everyday learning behaviors and their academic performance (De Feyter, Caers, Vigna, & Berings, 2012; Poropat, 2009; Spengler, Brunner, Martin, & Lüdtke, 2016). Besides motivational constructs such as task values or academic self-concepts (Eccles &

Journal of Personality, 2019, 001–17. | wileyonlinelibrary.com/journal/jopy | © 2019 Wiley Periodicals, Inc. | 1

## Originalarbeit

Brandt, N. D., Lechner, C. M., Tetzner, J., & Rammstedt, B. (2019). Personality, cognitive ability, and academic performance: Differential associations across school subjects and school tracks. Advance online publication.

*Journal of Personality.*

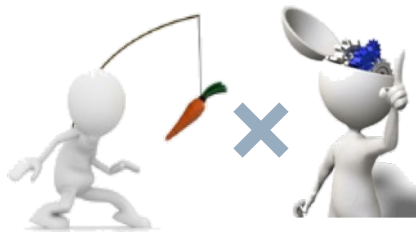
[https://doi.org/10.1111/](https://doi.org/10.1111/jopy.12482)

[jopy.12482](https://doi.org/10.1111/jopy.12482)



# Wie wirken sozio-emotionale Fähigkeiten (z.B. Interesse) und kognitive Fähigkeiten zusammen?

## Sozio-emotionale Fähigkeiten in Klasse 9



- Interesse und kognitive Fähigkeiten beeinflussen sich wechselseitig
- Hohes Interesse verstärkt den Effekt kognitiver Fähigkeiten auf die Kompetenzentwicklung (und umgekehrt)



# Die Ergebnisse wurden in der Zeitschrift Intelligence veröffentlicht



## Originalarbeit

Lechner, C. M., Miyamoto, A., &  
Knopf, T. (2019).

Should students be smart,  
curious, or both? Fluid  
intelligence, Openness, and  
interest co-shape the acquisition  
of reading and math  
competence.

Advance online publication.

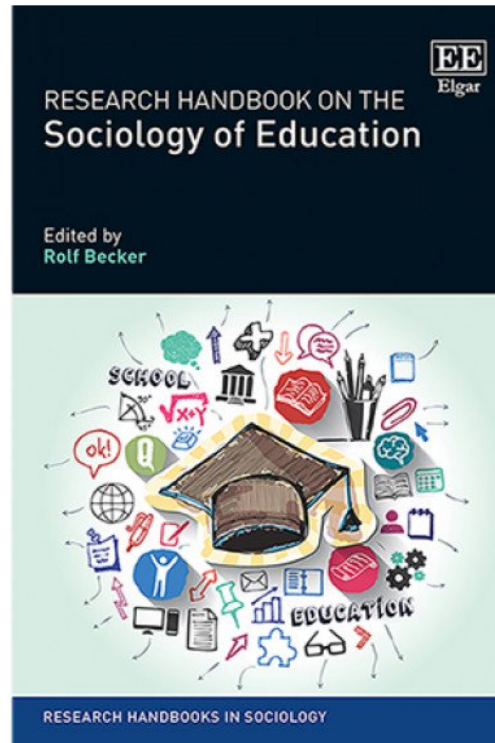
*Intelligence.*

[https://doi.org/10.1016/  
j.intell.2019.101378](https://doi.org/10.1016/j.intell.2019.101378)

# Einen Überblick über Forschung zu sozio-emotionalen Fähigkeiten bietet unser Buchkapitel

## Buchkapitel

Lechner, C. M., Anger, S., & Rammstedt, B. (2019). Socioemotional skills in education and beyond: Recent evidence and future avenues. In R. Becker (Ed.), *Research Handbook on Sociology of Education*. Cheltenham: Edward Elgar.



23. Socio-emotional skills in education and beyond: recent evidence and future research avenues\*  
*Clemens M. Lechner, Silke Anger and Beatrice Rammstedt<sup>1</sup>*

### 1. INTRODUCTION

#### 1.1 What are Socio-emotional Skills – and Why Should Educational Researchers Care?

Character strengths and virtues have always been a central point of reference for pedagogy and the philosophy of education. What character strengths and virtues are essential for the 'good life'? How can they be cultivated, for example through education and deliberate practice? Fundamental questions such as these have attracted some of the greatest minds – from the ancient Greco-Roman tradition, especially the virtue ethics of Aristotle, and the ancient Chinese philosophy of Confucius and Mencius up until the present day (for an overview, see Peterson and Seligman 2004). In modern-day quantitative social science research, however, systematic inquiries into these questions have only recently come to full fruition. Especially in the past decade, there has been a noticeable surge in educational researchers' interest in so-called *socio-emotional skills* or *non-cognitive skills*. These (somewhat controversial) umbrella terms cover a wide range of personal characteristics such as personality traits, motivation, preferences and values.<sup>2</sup> The common denominator of these characteristics is that (1) they are *not* measured by typical cognitive ability tests (hence the term 'non-cognitive'); (2) they manifest themselves in relatively consistent patterns of behaviour, cognition and affect; and (3) they are shaped in part by socialization and learning, despite often substantial genetic influences (i.e. heritability; Vukasovic and Branko 2015; Kandler and Zapka-Willmes 2017). Such characteristics can be conceived of as *skills* inasmuch as (1) they are relatively hard to acquire (i.e. not all individuals develop them to the same extent); and (2) they have beneficial effects on relevant life outcomes (OECD 2015; Gutman and Schoon 2016; Heckman et al. 2006; Heckman and Kautz 2012; Borghans et al. 2008; for an overview, see Almlund et al. 2011; Brunello and Schlotter 2011).

In the absence of a definitional consensus, studies have utilized widely varying conceptions and measures of socio-emotional skills. Yet, a large and growing number of studies have endorsed the Big Five framework as a guidepost (De Raad 2000; Goldberg 1990; John et al. 2008). The Big Five is presently the most well-validated and widely used model of human personality. Having emerged as the *de facto* consensus model since the 1990s (see McCrae and Costa 1999), the five-factor model has greatly facilitated the systematic study of socio-emotional skills by providing an organizing schema. Many other socio-emotional skill measures can be conveniently subsumed under one of its five global domains.<sup>3</sup> These domains are Extraversion, Agreeableness, Conscientiousness, Emotional Stability (or Neuroticism), and Openness to Experience. Within each of these five broad

## An der hier präsentierten Forschung haben viele WissenschaftlerInnen mitgewirkt

### GESIS



**Clemens Lechner**



**Beatrice Rammstedt**



**Ai Miyamoto**



**Thomas Knopf**

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**Silke Anger**  
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**Naemi Brandt**  
Uni Hamburg



**Daniel Danner**  
HdBA



**Julia Tetzner**  
DIPF

Vielen Dank für Ihre Aufmerksamkeit

gesis

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# Big Five Persönlichkeitseigenschaften werden meist im Selbstbericht gemessen

	<b>Extraversion</b>	Geselligkeit	Ich gehe aus mir heraus, bin gesellig.
		Durchsetzungs.	Ich neige dazu, die Führung zu übernehmen.
		Aktivität	Ich bin voller Energie und Tatendrang.
	<b>Verträglichkeit</b>	Mitgefühl	Ich bin hilfsbereit und selbstlos.
		Höflichkeit	Ich begegne anderen mit Respekt.
		Vertrauen	Ich schenke anderen leicht Vertrauen, glaube an das Gute im Menschen.
	<b>Gewissenhaftigkeit</b>	Ordnungsliebe	Ich mag es sauber und aufgeräumt.
		Fleiß	Ich bin effizient, erledige Dinge schnell.
		Verlässlichkeit	Ich bin verlässlich, auf mich kann man zählen.
	<b>Emotionale Stabilität</b>	Ängstlichkeit	Ich mache mir oft Sorgen.
		Niedergeschl.	Ich bin oft deprimiert, niedergeschlagen.
		Unbeständigk.	Ich kann launisch sein, habe schwankende Stimmungen.
	<b>Offenheit</b>	Ästh. Empfind.	Ich kann mich für Kunst, Musik und Literatur begeistern.
		Int. Neugierde	Ich bin vielseitig interessiert.
		Krea. Einfallsr.	Ich bin originell, entwickle neue Ideen.