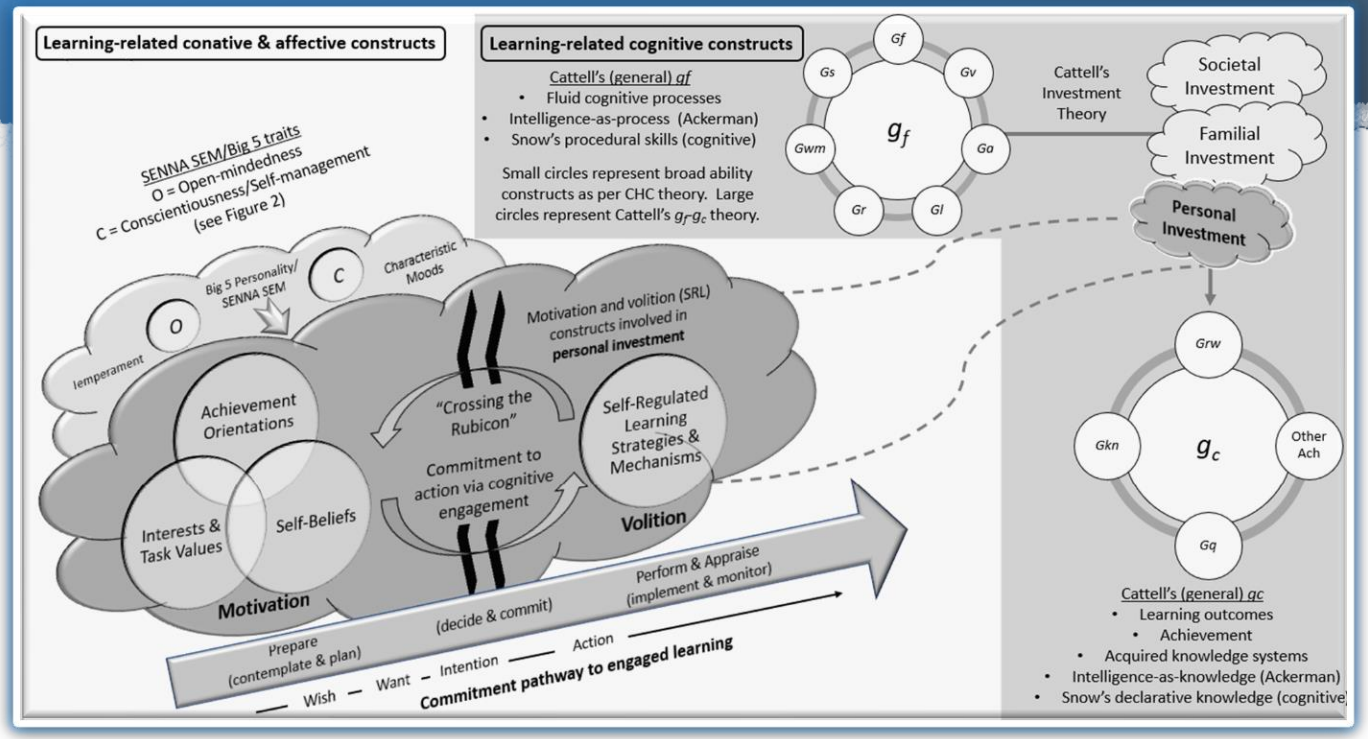
The Model of Achievement Competence Motivation (MACM)

A: Introduction and Background (1st in multi-module series)

(K. McGrew 01-04-2021)



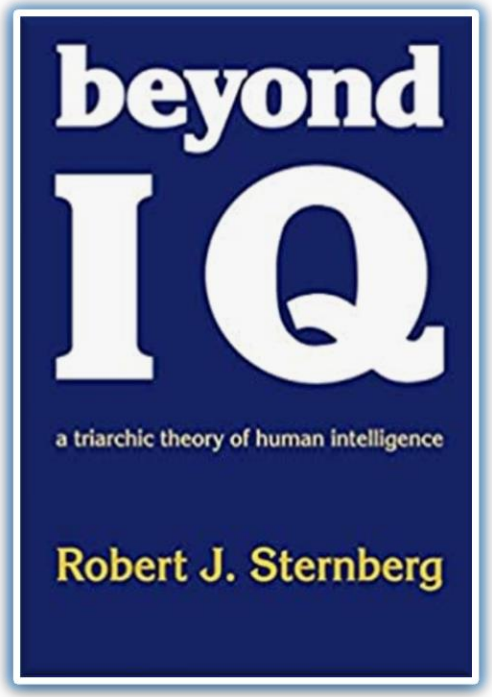
These slides are provided as supplements to *The Model of Achievement Competence Motivation (MACM): Standing on the shoulders of giants* (McGrew, in press, 2021—for special issue on motivation in *Canadian Journal of School Psychology*). The slides in this PPT/PDF module can be used without permission for educational (not commercial) purposes

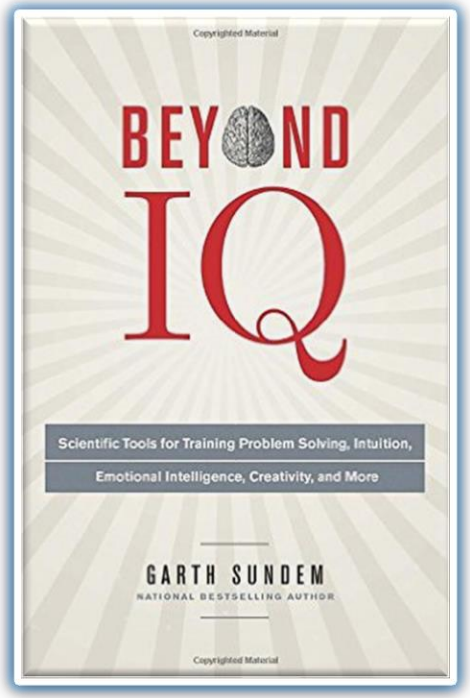
The Model of Achievement Competence Motivation (MACM)
(K. McGrew 01-04-2021)

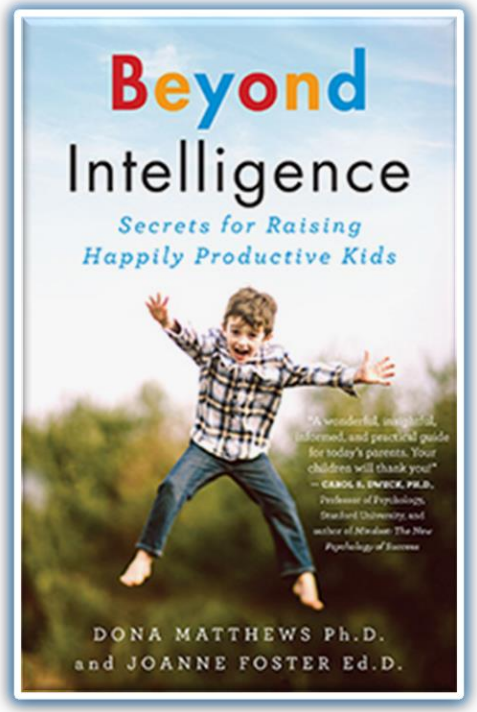
Part A: Why was MACM Developed?

- Educational Reform and Policymakers
- Educational/Psychological Research & Theory
- Brief History of Conative Abilities
- Models of School Learning
- The Snow Academic Aptitude Framework

Why?: Going "beyond cognitive abilities or IQ" has been an area of study in education, psychology and policy for decades







The Model of Achievement Competence Motivation (MACM)

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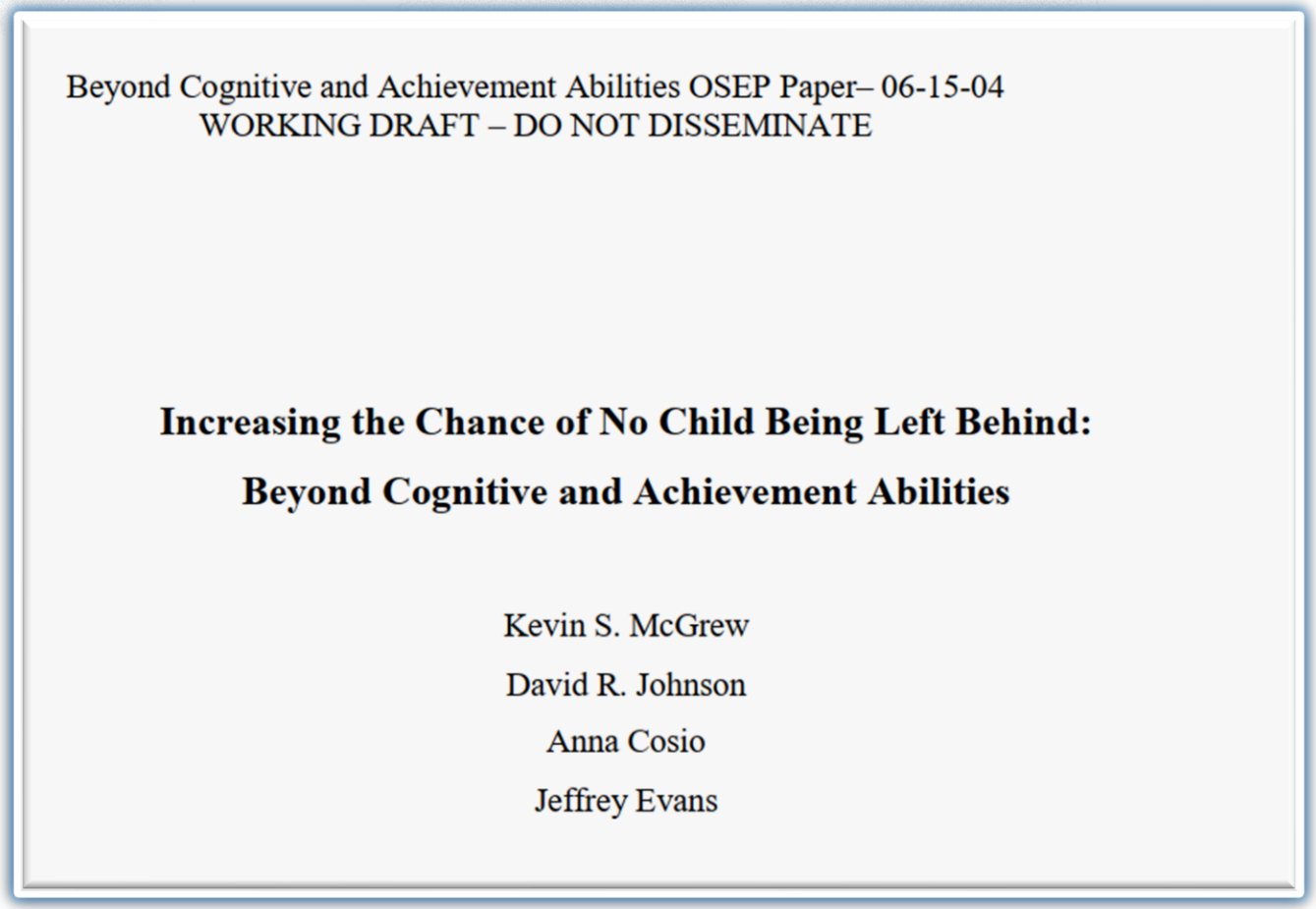
Why: Educational Policy Initiatives

(2002-2015)

Why: A response to NCLB Education Policy Initiatives

NCEO
National Center on Educational Outcomes

http://www.iapsych.com/articles/mcgrew2004.pdf.



Beyond Cognitive and Achievement Abilities OSEP Paper– 06-15-04
WORKING DRAFT – DO NOT DISSEMINATE

Increasing the Chance of No Child Being Left Behind:

Beyond Cognitive and Achievement Abilities

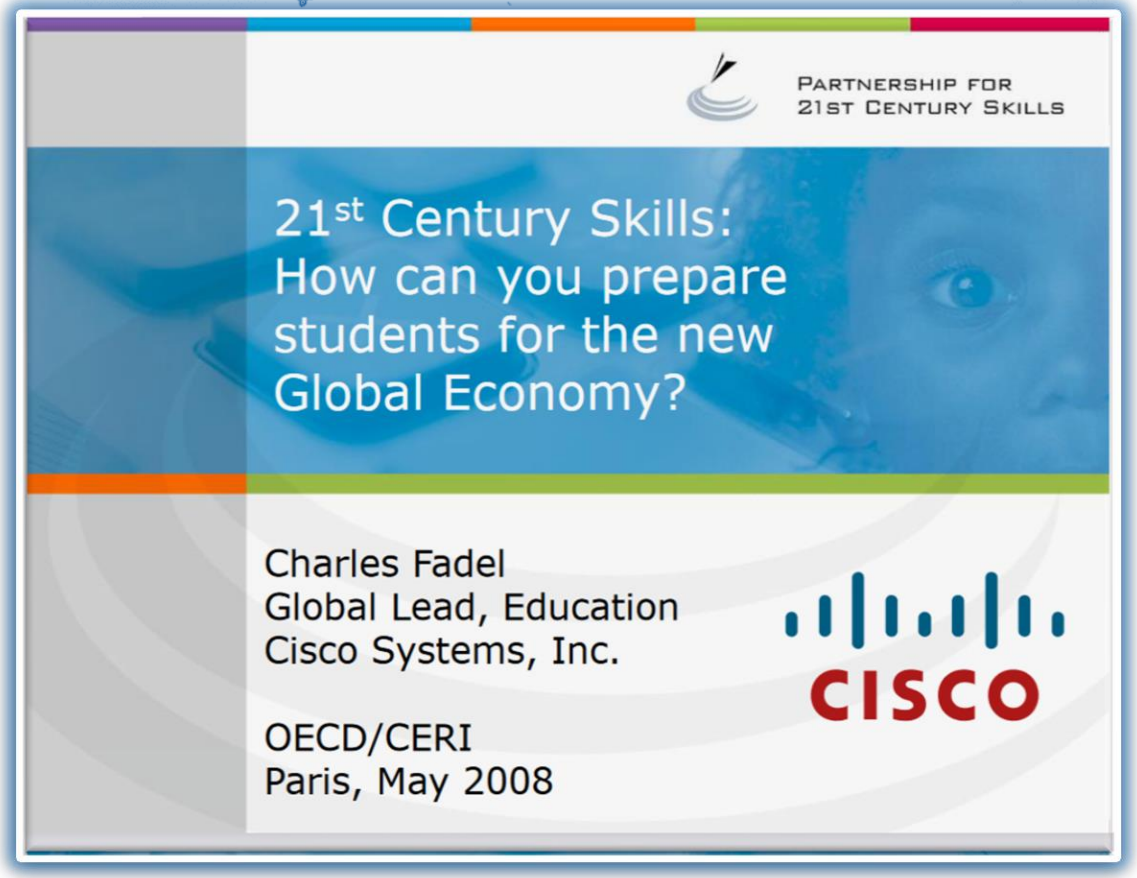
Kevin S. McGrew

David R. Johnson

Anna Cosio

Jeffrey Evans

Why: Recent International Policy Initiatives—OECD and 21st Century Skills



The Model of Achievement Competence Motivation (MACM)

Part A: Why was MACM Developed?

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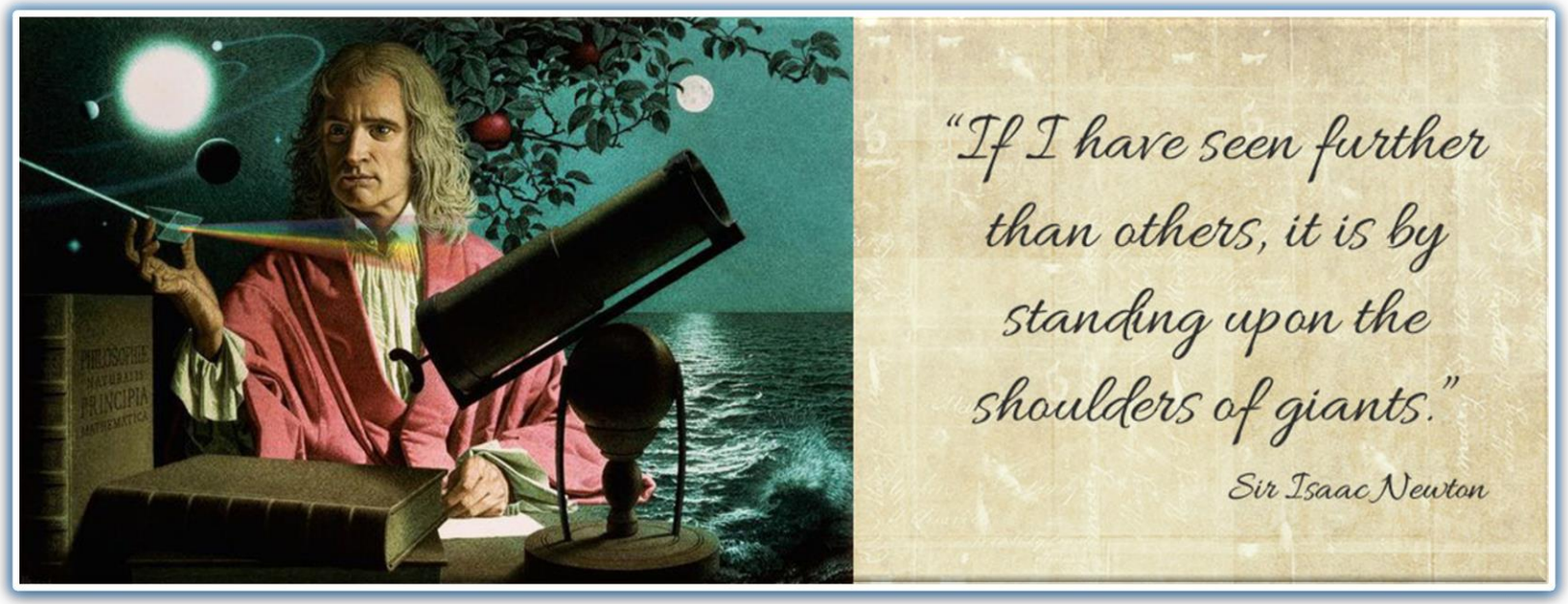
Why was MACM developed?
Standing on the Shoulders of Giants



Going Beyond IQ

Intelligence tests are important and powerful predictors of achievement: But they are fallible predictors

Cattell's (1987) wise words, written over 30 years ago, still apply (unfortunately) to the state-of-the-art of **psychology's limited conceptual integration of cognitive, conative and affective constructs** in understanding student learning —"The school psychologists of the first half of this century made a big mistake in trying to estimate school performance and scholarship readiness from **the I.Q. alone. Typically, only half the variance in grades is thus accounted for,** and, as we now realize …much of the rest can be accounted for by predictions from ***personality and motivation measures*** [emphasis added]" (p. 435). (McGrew, in press, 2021)

Intelligence tests are important and powerful predictors of achievement: But they are fallible predictors

Synthesis Report 54

Expectations for Students with Cognitive Disabilities: Is the Cup Half Empty or Half Full? Can the Cup Flow Over?

Kevin S. McGrew
Institute for Applied Psychometrics (IAP)

Jeffrey Evans
Evans Consulting

November 2004

McGrew, K. S., Evans, J. (2004). *Expectations for students with cognitive disabilities: Is the cup half empty or half full? Can the cup flow over?* (Synthesis Report 54). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Figure 2. Distribution of WJ III Total Achivement Scores for WJ III Norm Subjects with IQs 70-80

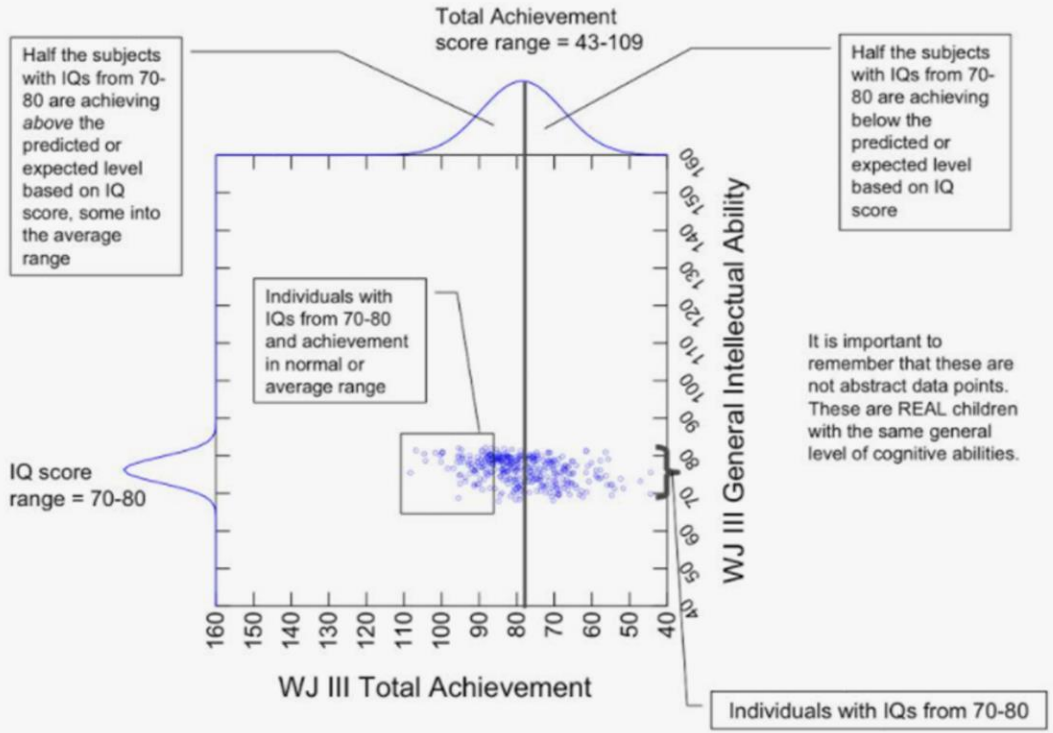
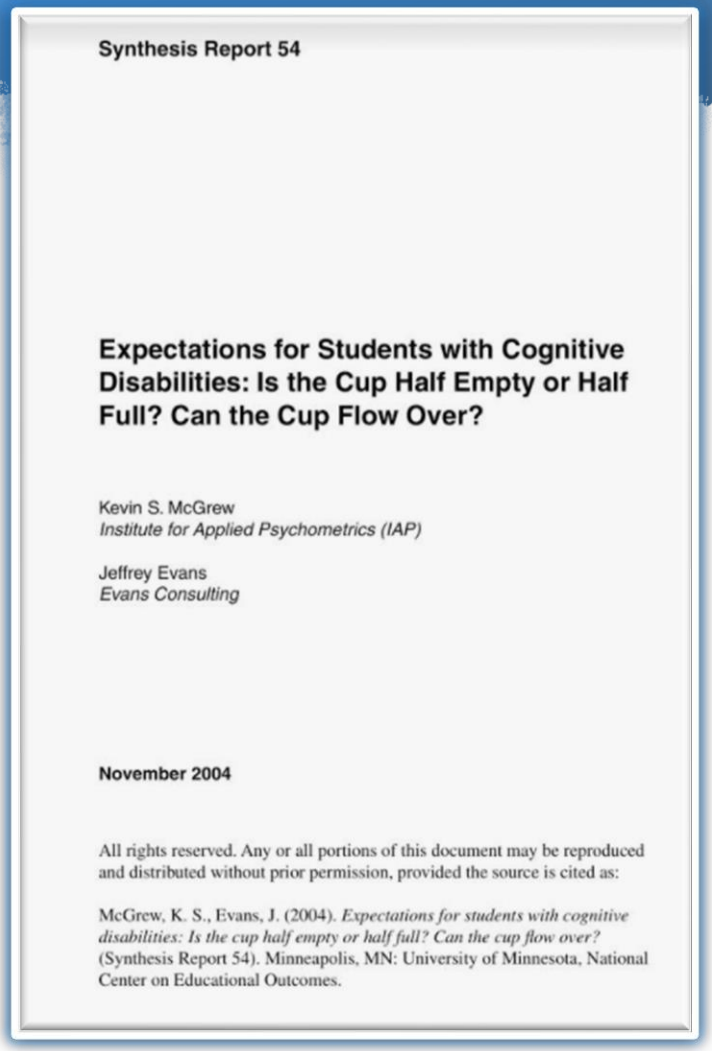


Figure 2. Distribution of WJ III Total Achievement scores for WJ III norm subjects with IQs 70-80. Note that the axes of this figure have been rotated from that in Figure 1.

The data presented in Figure 2 are based on unpublished analyses of the WJ III standardization by the first author of the current paper (McGrew, et al., 2004).

Intelligence tests are important and powerful predictors of achievement: But they are fallible predictors



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McGrew and Evans (2004) reminded educators, psychologists, and policy makers that with the best IQ tests, and for any particular IQ score, there is a **normal distribution of achievement scores around each IQ score** (after adjusting for regression to the mean). Expected achievement scores **for any IQ score could show a band of expected achievement standard scores that range close to 22 points (± 11) for approximately 2/3 of the population.** The point was clear—**IQ test scores, or related diagnostic categories, should not be used as an excuse to formulate lower academic expectations for students with disabilities**. (McGrew, in press, 2021)

The Model of Achievement Competence Motivation (MACM)

Part A: Why was MACM Developed?

- Educational Reform and Policymakers
- Educational/Psychological Research & Theory
- **Brief History of Conative Abilities**

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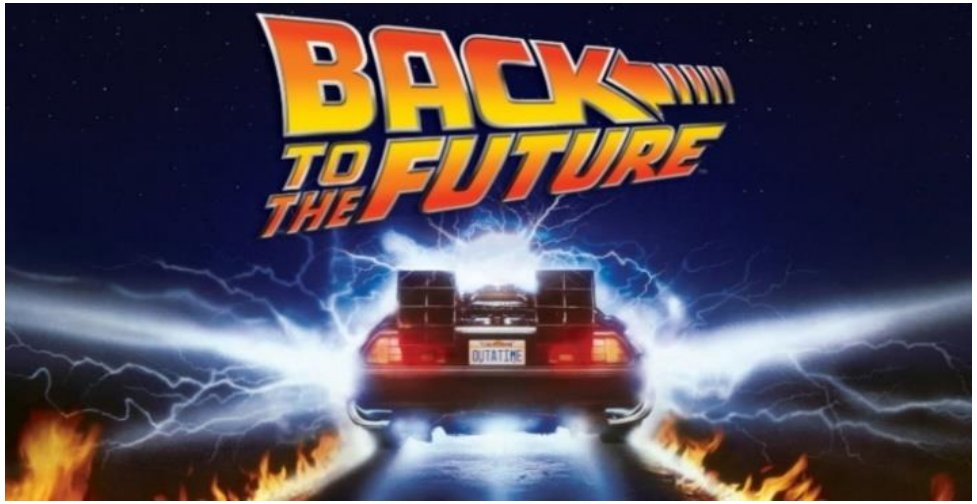
Why was MACM developed?
Back to the Future



Going Beyond IQ

Why: Educational & psychological research has identified "non-cognitive factors" as important for school learning (e.g., Messick, 1979)

Journal of Educational Psychology
1979, Vol. 71, No. 3, 281–292

Potential Uses of Noncognitive Measurement in Education

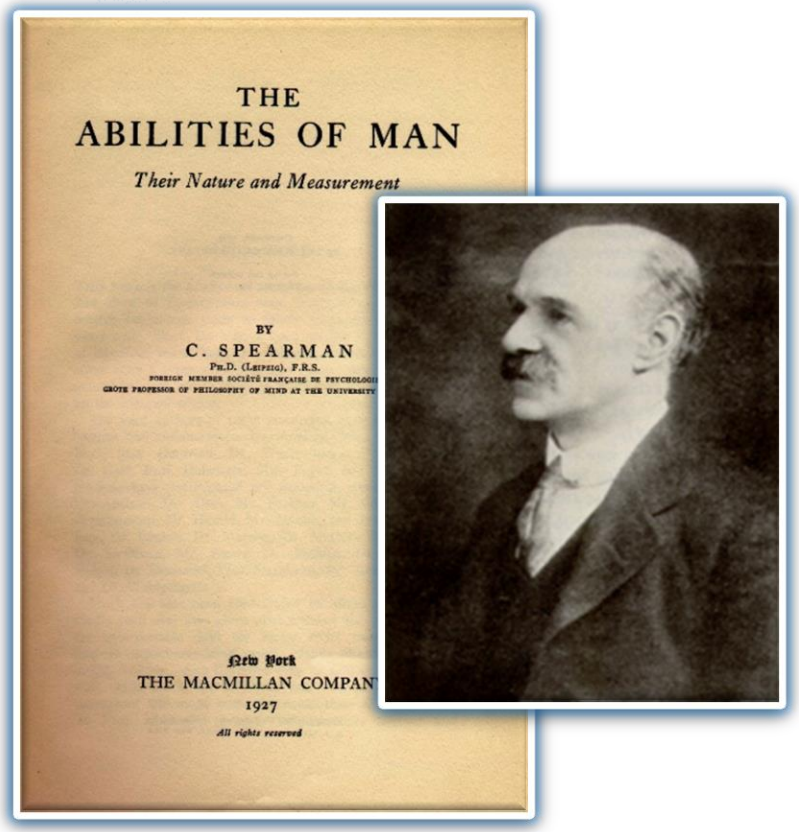
Samuel Messick
Educational Testing Service, Princeton, New Jersey

Why: Educational & psychological research has identified "non-cognitive factors" as important for school learning (e.g., Messick, 1979)

Table 1. Varieties of non-cognition (Messick, 1979)

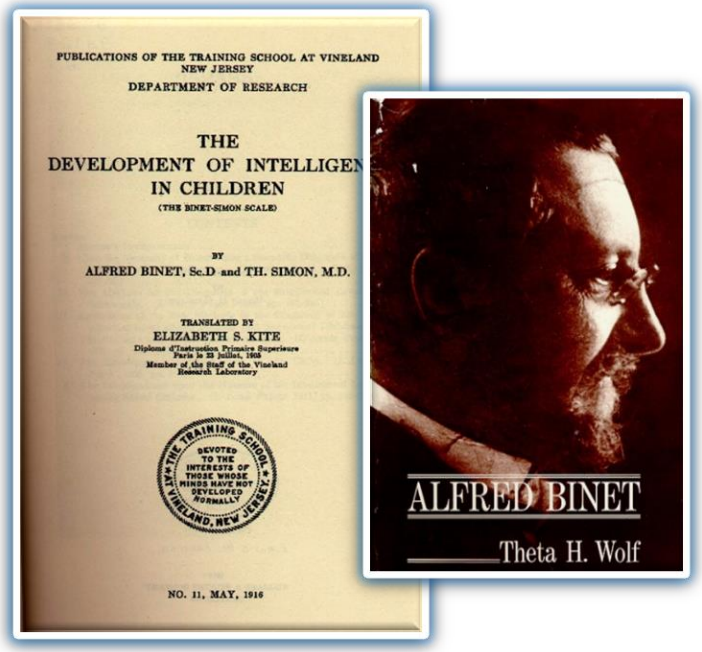
Varieties	Description/examples
Experiential/background	work experience, educational history, demographics
Affect	positive/negative feeling, state (anxiety)
Attitude/belief	action tendency, orientation to learning/self, locus of control
Interest	pattern of choice, preferences
Motivation	need for achievement, need for approval
Curiosity	exploratory drive
Temperament	disposition influencing behavioural style
Social sensitivity	interpersonal competence, empathy, leadership, tolerance
Coping strategy	meeting requirements of demanding environment
Cognitive style	information processing consistencies reflecting personality
Creativity	fostering originality and creative mind in education
Values	social standards, morality

Spearman on “conative” abilities (1927)



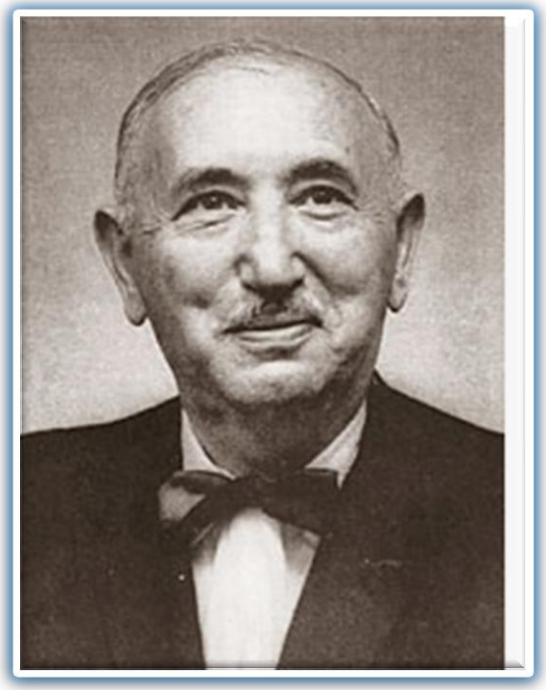
“The process of **cognition** *cannot possibly be treated apart* from those of **conation and affection**, seeing that all these are but inseparable aspects in the instincts and behavior of a single individual, who himself, as the vary name implies, is essentially indivisible” (p. 2)

Alfred Binet's definition of Intelligence (Corno et al., 2002 translation by Terman, 1916)



"The tendency to take and **maintain a definite direction**; the capacity to make adaptations for the purpose of **attaining a desired end**; and the power of **auto-criticism**" (translation by Terman, 1916, p. 45). All three of these phrases refer at least as much to **conative processes and attitudes** as to reasoning powers.

David Wechsler (1944) on "non-intellective factors"



"When our scales measure the **non-intellective** as well as the intellectual factors in intelligence, they will more nearly measure what in **actual life corresponds to intelligent behavior**" (p. 103)

Conative and noncognitive: The jingle jangle jungle

Personality and Individual Differences 134 (2018) 25–32

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Review

Noncognitive proponents' conflation of "cognitive skills" and "cognition" and its implications☆

Harrison J. Kell

“Noncognitive:” Too many cooks in the kitchen

Noncognitive skills have drawn the interest of **psychologists, educators, economists and policymakers** over the past 30 years.

The research literature….is vast and the noncognitive domain has drawn the interest of a wide cross-section of individuals **outside scientific psychology** (e.g., economists, educators, practitioners, policymakers).

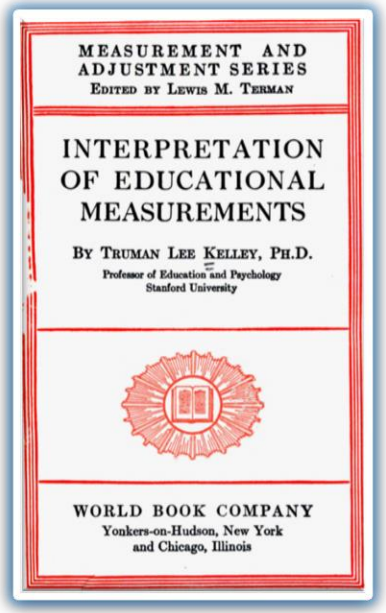
Noncognitive: "Everybody hates this term" (Kell, 2018)

There is **long-standing and widespread dissatisfaction** with the label "noncognitive skills"

"Everybody hates this term" (Easton, 2013, p. 8). Mostly simply, the term indicates that **noncognitive skills are whatever cognitive skills are not**.

"noncognitive" implies that the constructs and measures do not entail cognition, a **virtual impossibility**.

The jingle-jangle-jungle in the motivation (conation) literature

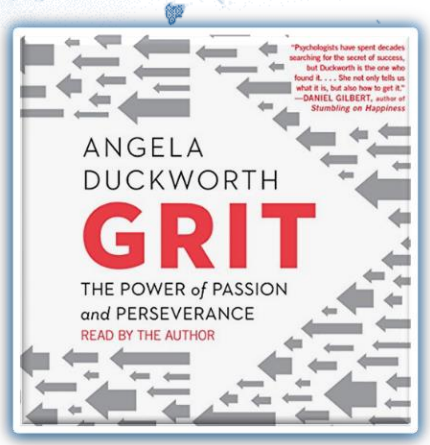


(Kelly, 1927)

The **jingle-jangle-jungle** is when erroneous assumptions are made that two different things are the same because they have the same name (**jingle fallacy**) or are identical or almost identical things are different because they are labeled differently (**jangle fallacy**).

(Schneider & McGrew, 2018)

The jingle-jangle-jungle in the motivation (conation) literature: A recent example--Grit



Journal of Personality and Social Psychology
2017, Vol. 113, No. 3, 492–511

0022-3514/17/$12.00 http://dx.doi.org/10.1037/pspp0000102

Much Ado About Grit: A Meta-Analytic Synthesis of the Grit Literature

Marcus Credé and Michael C. Tynan
Iowa State University

Peter D. Harms
University of Alabama

An interest in what Duckworth and colleagues refer to as grit, perseverance, and consistency is **not new to psychology**. Studies of attributes such as will power, tenacity, determination, persistence of motives, and volitional perseveration **date back over 80 years.**

The jingle-jangle-jungle in the motivation (conation) literature: A recent example--Grit

- 584 effect sizes from 88 independent samples representing 66,807 individuals.
- The higher order structure of grit is **not confirmed.**
- Grit is very **strongly correlated with conscientiousness**.
- Overall grit explains **no variance** in either overall academic performance or high school GPA after **controlling for conscientiousness**.
- **Interventions** designed to enhance grit may only have **weak effects on performance and success.**
- That the **construct validity of grit is in question.**

The jingle-jangle-jungle in the motivation (conation) literature: A recent example--Grit

Indeed, the **correlation between overall grit** and conscientiousness, and between persistence and conscientiousness **(.89) is much stronger than what is typically found** between scores on two different global measures of conscientiousness (.63; Pace & Brannick, 2010).

This, in turn, suggests that grit research may have **fallen victim to the jangle fallacy** and that grit as currently measured is simply a **repackaging of conscientiousness or one of the facets of conscientiousness.**

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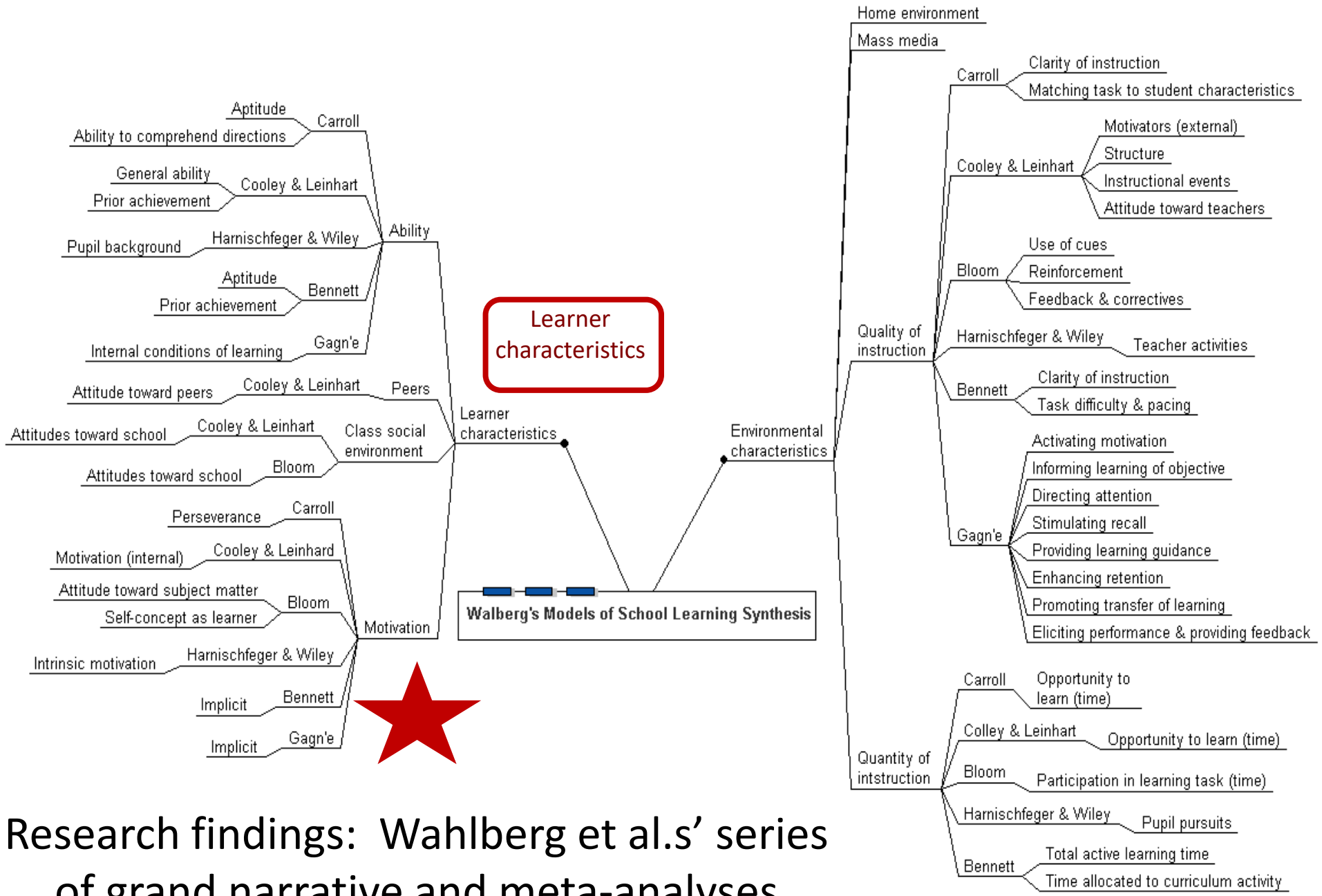
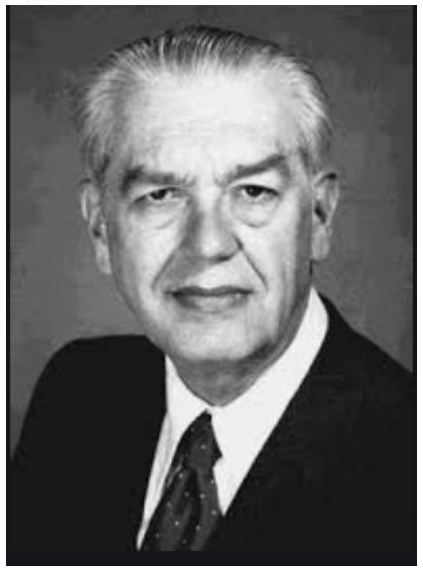


Research findings: Wahlberg et al.s' series of grand narrative and meta-analyses reviews and theoretical testing of models

of school learning

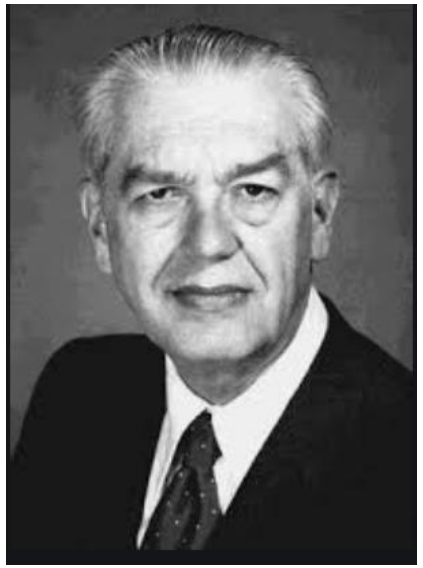
Research-based reasons: Models of School Learning



Learner characteristics

John B. Carroll's 1963 elegant **Model of School Learning**, which spawned a variety of models of school learning and educational productivity, reminds us that **individual difference variables (e.g., IQ) are only PART of the equation of school learning**. Other variables **OUTSIDE of the individual** help explain why someone achieves above or below their IQ score.

Research-based reasons: Models of School Learning



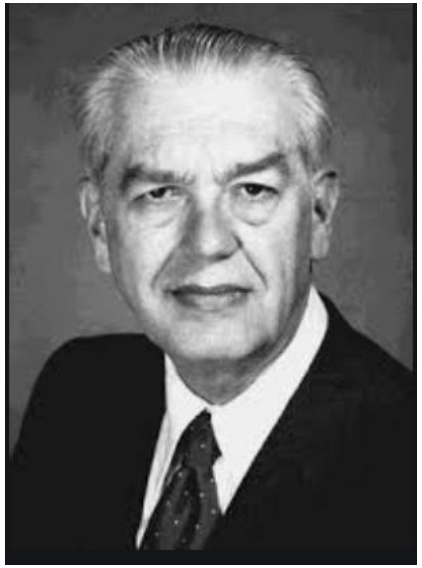
$$\text{Degree of learning} = f\,\frac{\text{Time spent learning}}{\text{Time needed to learn}}$$

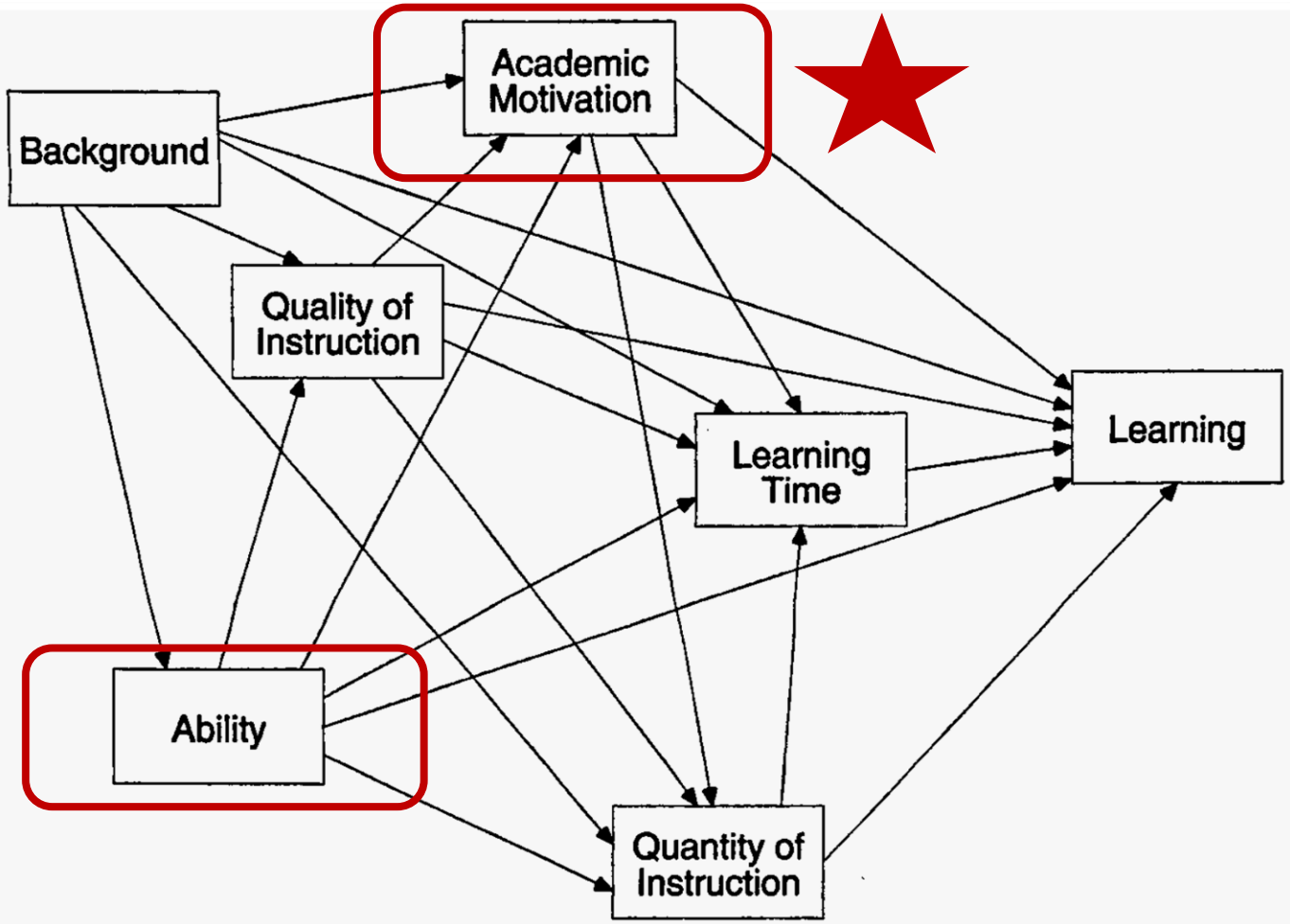
Research-based reasons: Models of School Learning

$$\text{Degree of learning} = f\left[\frac{\text{Opportunity to learn or Time allocated for learning} \times \text{Perseverance or Percentage of time actually spent engaged in learning}}{\text{Aptitude or Time actually needed to learn} \times \text{Quality of Instruction} \times \text{Ability to understand instruction}}\right]$$

FIGURE 8-1 The Carroll model.
SOURCE: Berliner (1990). Reprinted with permission of Teachers College Press.

Learner characteristics





Learner characteristics

Figure 3. A generic model of school learning, for high school students, using the most common constructs from school learning theories. Adapted from "Using Path Analysis to Test the Importance of Manipulable Influences on School Learning," by T. Z. Keith, *School Psychology Review, 17,* p. 639. Copyright 1988 by the National Association of School Psychologists. Adapted with permission.

Research findings: A series of grand narrative and meta-analyses reviews and theoretical testing of models

Walberg et al.'s model of educational productivity (simplified)

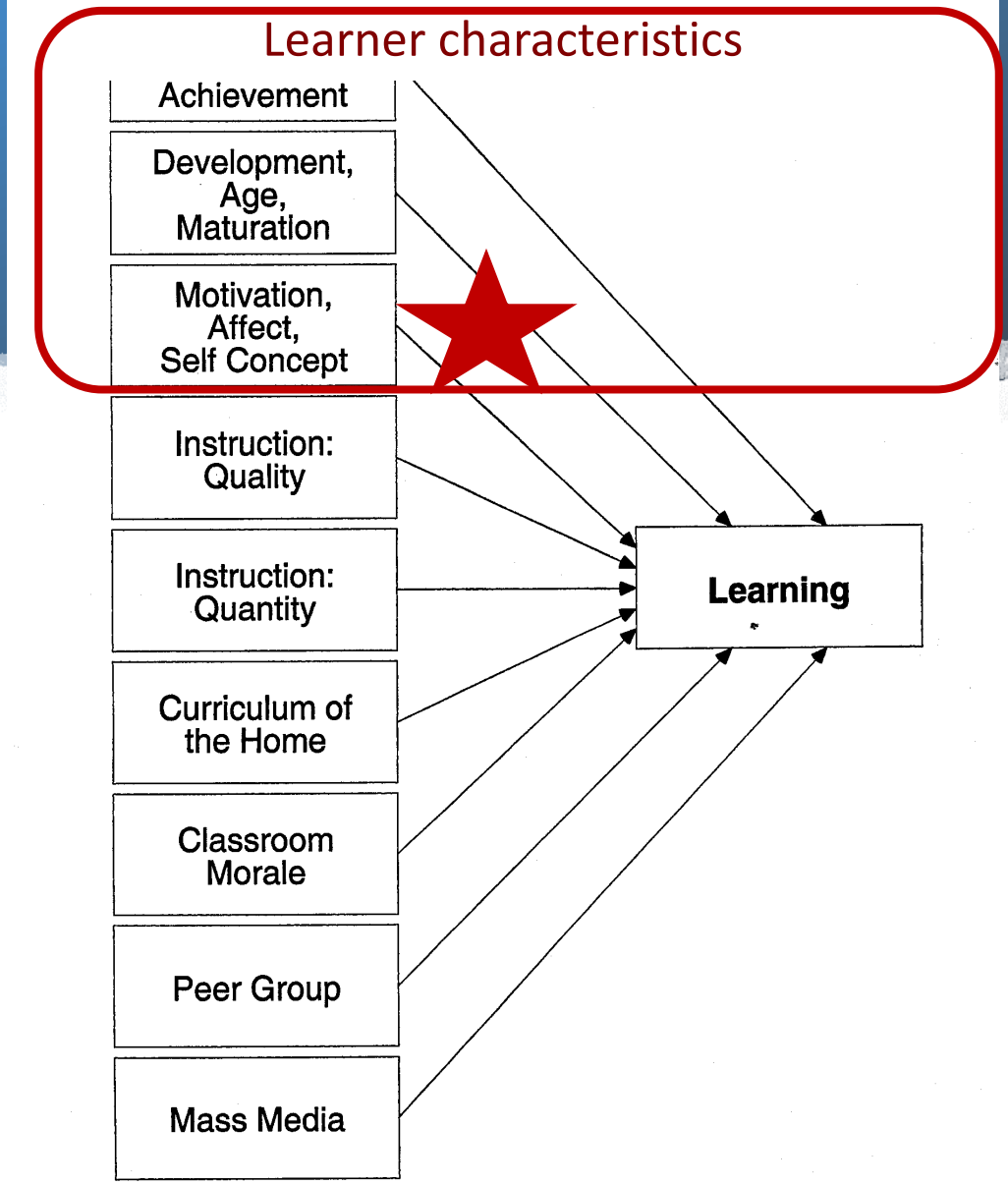
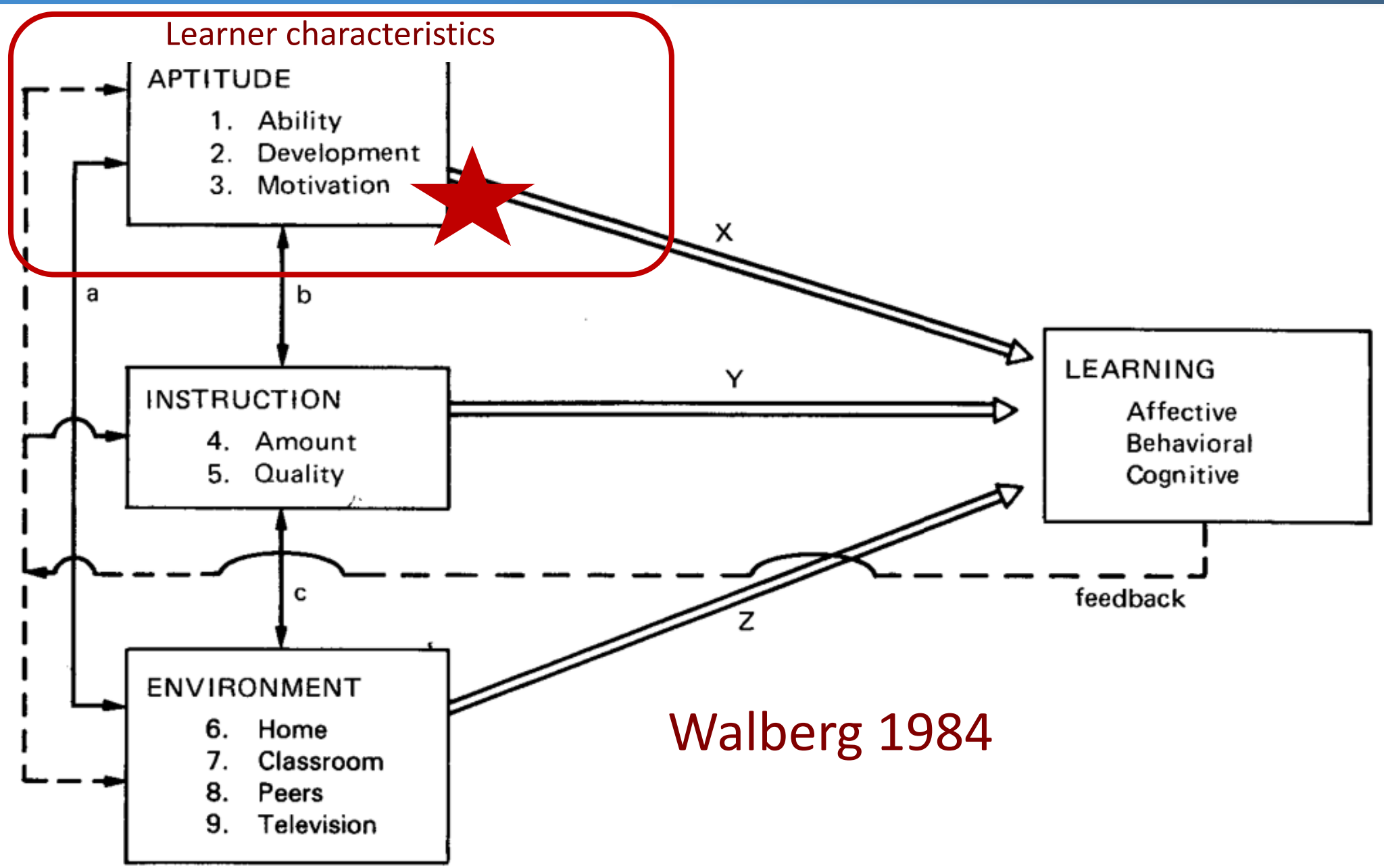


Figure 2. Walberg's Theory of Educational Productivity.



Walberg 1984

FIGURE 1. Casual Influences on Student Learning.

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Salient research findings: Student learner characteristics are important (McGrew et al., 2004)

The **direct intervention in the psychological determinants** of learning promise the most effective avenues for reform" (Wang et al., 1997).

Targeted **student learning characteristics** (i.e., social, behavioral, motivational, affective, cognitive, and metacognitive) are the set of variables with the **most potential for modification** that could significantly positively effect student outcomes (DiPernal et al., 2002; in McGrew et al., 2004).

Salient research findings: Student learner characteristics are important (Detterman, 2016)

The Spanish Journal of Psychology (2016), **19**, e93, 1–11.
© Universidad Complutense de Madrid and Colegio Oficial de Psicólogos de Madrid
doi:10.1017/sjp.2016.88

CAMBRIDGE UNIVERSITY PRESS

Education and Intelligence: Pity the Poor Teacher because Student Characteristics are more Significant than Teachers or Schools

Douglas K. Detterman

Putting it all together

In the first part of this paper, I presented evidence that schools and teachers account for less than 10% of the total variance in academic achievement and that student characteristics account for 90%. This observation has been supported by many studies and reviews and has been known at least since the 1960s. In fact, in the

Salient research findings: Student learner characteristics are important--Motivation and intelligence meta-analysis

4.1. Relative importance of intelligence and motivation for school achievement

A central finding of our meta-analysis is that intelligence and motivation are only weakly positively associated with one another ($M(r) = 0.17$) and commonly explained 16.6% of the overall explained variance in school achievement. That the correlation between intelligence and motivation was weak is in line with our hypothesis and results from previous studies (e.g., Friedrich, Flunger, Nagengast, Jonkmann, & Trautwein, 2015; Preckel, Goetz, Pekrun, & Kleine, 2008; Zaunbauer et al., 2009). It can be assumed that intelligence and motivation mutually reinforce one another, such that students with higher intelligence are likely to develop a higher academic self-concept, higher self-efficacy and higher intrinsic values, which in turn enhance knowledge acquisition and the improvement of one's abilities (Spinath et al., 2006). This suggests that the interplay of intelligence and motivation is also important for predicting school achievement, and that including both constructs in the prediction of school achievement will lead to a higher proportion of overall explained variance.

Moreover, our results indicate that intelligence is a strong predictor of school achievement, with an average correlation of $M(r) = 0.44$. Moreover, in line with our hypothesis, the portion of the overall explained variance in school achievement specifically predicted by intelligence (66.6%) was higher than for motivation (16.6%) or the share commonly explained by intelligence and motivation together (16.6%). This finding is in line with previous results from meta-analyses showing the importance of intelligence for predicting school achievement (e.g., Gottfredson, 2002; Gustafsson & Undheim, 1996; Kuncel et al., 2004; Neisser et al., 1996; Roth et al., 2015). The fact that intelligence alone accounted for 66% of the overall explained variance in school achievement underlines that intelligence is a strong and very important predictor of school achievement.

Salient research findings:
Motivation interventions meta-analysis

Review of Educational Research
June 2016, Vol. 86, No. 2, pp. 602–640
DOI: 10.3102/0034654315617832

Motivation Interventions in Education: A Meta-Analytic Review

Rory A. Lazowski
James Madison University

Chris S. Hulleman
University of Virginia

Number of studies, mean effect sizes, and confidence intervals (CIs) for each theoretical framework

Theory	*k*[a]	Average *d*	95% CI
Transformative experiences	4	0.74	[0.33, 1.16]
Self-determination	11	0.70	[0.53, 0.87]
Interest	2	0.69	[0.30, 1.08]
Goal setting[b]	1	0.67	—
Implicit theories of intelligence			[0.31, 0.80]
Attribution			[0.37, 0.71]
Self-confrontation[b]	1	0.54	—
Possible selves	3	0.49	[0.19, 0.80]
Multiple theoretical perspectives[c]	23	0.41	[0.29, 0.53]
Expectancy-value	7	0.39	[0.18, 0.59]
Achievement goals	4	0.38	[0.09, 0.67]
Self-affirmation	8	0.38	[0.19, 0.58]
Need for achievement[b]	1	0.36	—
Social belongingness	5	0.35	[0.07, 0.63]
Self-efficacy[d]	–	–	—
Achievement emotions[d]	–	–	—
Total	92	0.49	[0.43, 0.56]

Average ES = .49 !

Number of studies (k), mean effect sizes (average d), and confidence intervals (95% CI) for moderator analyses

Moderator type	*k*	Average *d*	95% CI
Student grade level			
Elementary school (K–Grade 5)	10	0.52	[0.31, 0.73]
Middle school (Grades 6–8)	24	0.57	[0.44, 0.69]
High school (Grades 9–12)	17	0.42	[0.27, 0.57]
Postsecondary	41	0.47	[0.38, 0.57]
Total	92	0.49	[0.43, 0.56]
Type of experimental design			
Randomized	64	0.43	[0.36, 0.50]
Quasi-experimental	28	0.64	[0.52, 0.75]
Total	92	0.49	[0.43, 0.56]
Degree of naturalness—Dependent variable (DV)			
DV in educational context	70	0.46	[0.39, 0.53]
DV not in educational context	22	0.63	[0.48, 0.77]
Total	92	0.49	[0.43, 0.56]
Degree of naturalness—One vs. two vs. three degrees			
One degree present	7	0.56	[0.30, 0.82]
Two degrees present	28	0.46	[0.34, 0.59]
Three degrees present	57	0.50	[0.42, 0.58]
Total	92	0.49	[0.42, 0.56]
Type of dependent variable			
Self-report	75	0.54	[0.46, 0.63]
Performance indicator	61	0.52	[0.43, 0.51]
Behavioral indicator	28	0.62	[0.49, 0.76]
Total	164	0.55[a]	[0.47, 0.58]

Salient research findings:
Self-regulated learning interventions meta-analysis

Metacognition Learning (2008) 3:231–264
DOI 10.1007/s11409-008-9029-x

Components of fostering self-regulated learning among students. A meta-analysis on intervention studies at primary and secondary school level

Charlotte Dignath · Gerhard Büttner

Average ES = .69 !

Fig. 1 Distribution of effect sizes grouped for primary and secondary school

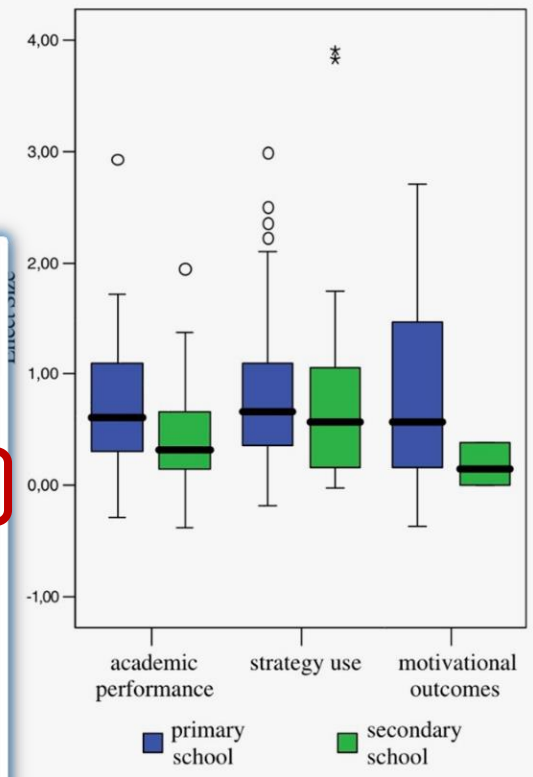


Table 2 Average effect sizes grouped according to outcomes

	Primary school mean ES (SE)	−95% CI	+95% CI	Secondary school mean ES (SE)	−95% CI	+95% CI
All dependent variables	0.68 (0.03) *n*=263	0.63	0.74	0.71 (0.05) *n*=94	0.61	0.81
Academic performance overall	0.61 (0.05) *n*=102	0.52	0.70	0.54 (0.11) *n*=34	0.31	0.76
Academic performance mathematics	0.96 (0.13) *n*=25	0.71	1.21	0.23 (0.08) *n*=12	0.07	0.38
Academic performance reading/writing	0.44 (0.06) *n*=55	0.34	0.55	0.92 (0.20) *n*=16	0.52	1.31
Academic performance other subjects	0.64 (0.09) *n*=22	0.46	0.83	0.05 (0.15) *n*=6	−0.25	0.36
Strategy use	0.72 (0.04) *n*=113	0.64	0.79	0.88 (0.06) *n*=54	0.76	1.00
Motivation	0.75 (0.09) *n*=48	0.57	0.92	0.17 (0.06) *n*=6 (*N*=1)	0.04	0.31

n Indicating number of effect sizes; *N* indicating number of studies

What is conation or conative?

The ***APA Dictionary of Psychology*** (VandenBos, 2007) defines ***conation*** as "the proactive (as opposed to habitual) part of motivation that connects knowledge, affect, drives, desires, and instincts to behavior. Along with COGNITION and affect, conation is **one of the three traditionally identified components of mind**" (p. 210).

The Model of Achievement Competence Motivation (MACM)

Part I: Why was MACM Developed?

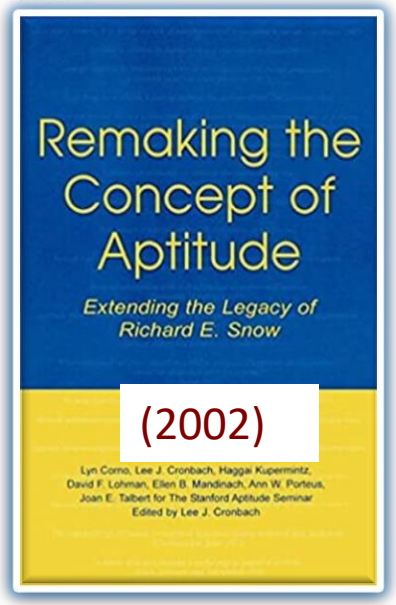
- Educational Reform and Policymakers
- Educational/Psychological Research & Theory
- Brief History of Conative Abilities
- Models of School Learning
- **The Snow Academic Aptitude Framework**

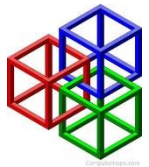
The need for A conative taxonomy

There have been few solid attempts to develop a research and theory-based **taxonomy of individual difference constructs** important for school learning

Such a grand model or taxonomy requires **integrating many different strands of theoretical and empirical research**

The need for A conative taxonomy





Snow's Academic Aptitude Model

A "provisional" taxonomy to help "**see the forest and the trees.**" Based on:

- A systematic program of educational research
- Integration of the extant literature (4 existing taxonomies)
- Emphasis on relatively stable constructs related to educational performance

The trilogy-of-the-mind taxonomy

Journal of the History of the Behavioral Sciences
16 (1980): 107–117.

THE TRILOGY OF MIND: COGNITION, AFFECTION, AND CONATION

ERNEST R. HILGARD

The tripartite classification of mental activities into cognition, affection, and conation originated in the German faculty psychology of the eighteenth century, but was adopted by the association psychologists of the nineteenth century of Scotland, England, and America. Its influence extended into the twentieth century through the writings of William McDougall. It is proposed that the classificatory scheme is still useful in the assessment of contemporary emphases in psychology, such as the present prominence of cognitive psychology to the relative neglect of affection and conation.

The trilogy-of-the-mind taxonomy

The cognition, affection, and conation ***trilogy-of-the-mind*** originated in the German faculty psychology of the eighteenth century and has **endured as a model for describing the division of labor that characterizes intellectual functioning** (Hilgard, 1980).

Eventually **conation experienced a demotion** (when compared to cognition) and was ignored or was merged with affection and the two considered mere associates of cognition (Snow & Farr, 1987).

(McGrew, in press, 2021)

The trilogy-of-the-mind taxonomy

A central thesis of this article is that this ageless trilogy, and **conation** in particular, be resurrected as an overarching and revised ***aptitude*** framework from which psychologists can conceptualize motivational and other conative constructs.

(McGrew, in press, 2021)

Snow, Corno & Jackson, 1996
(Handbook of Educational Psychology)

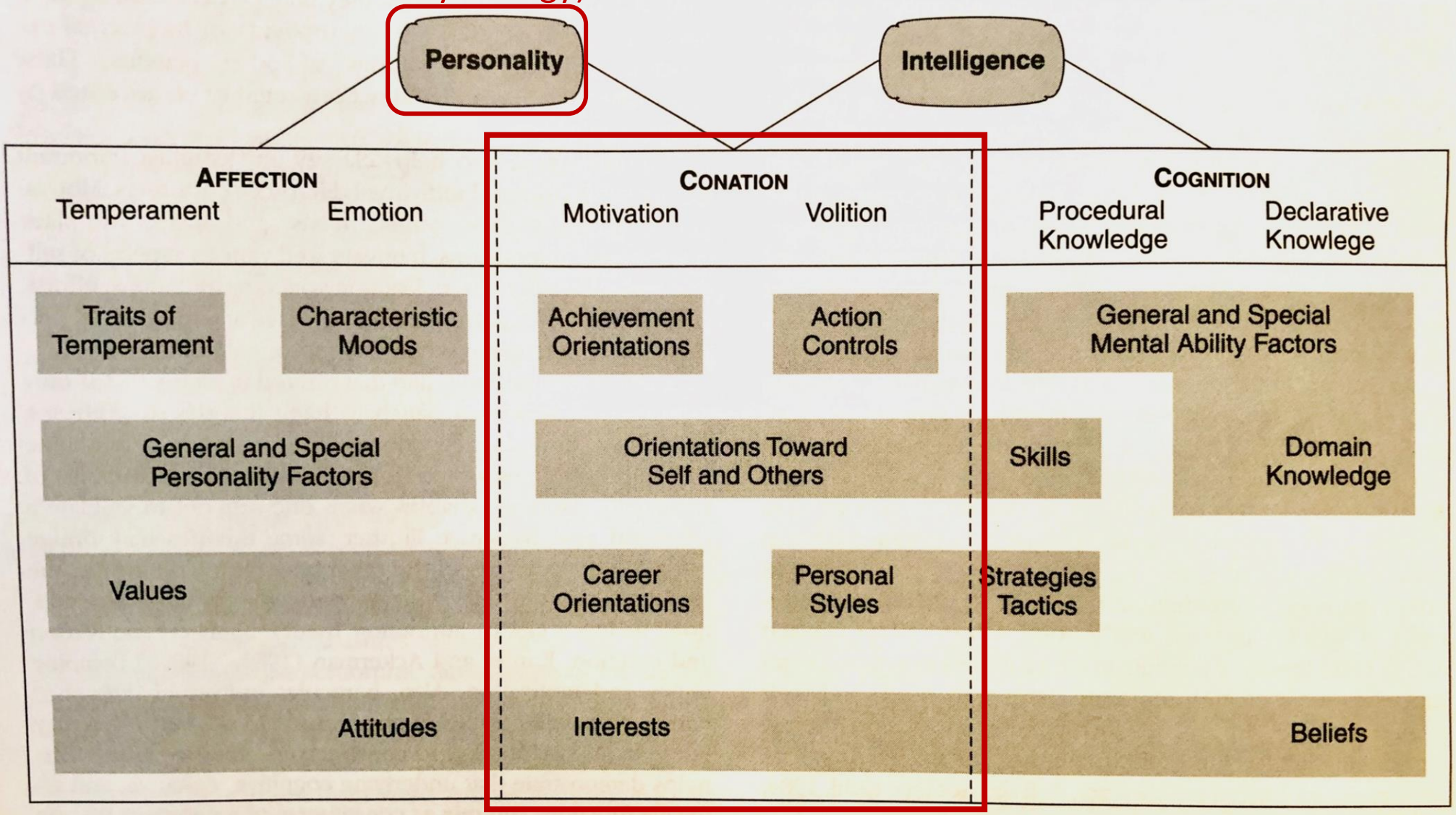
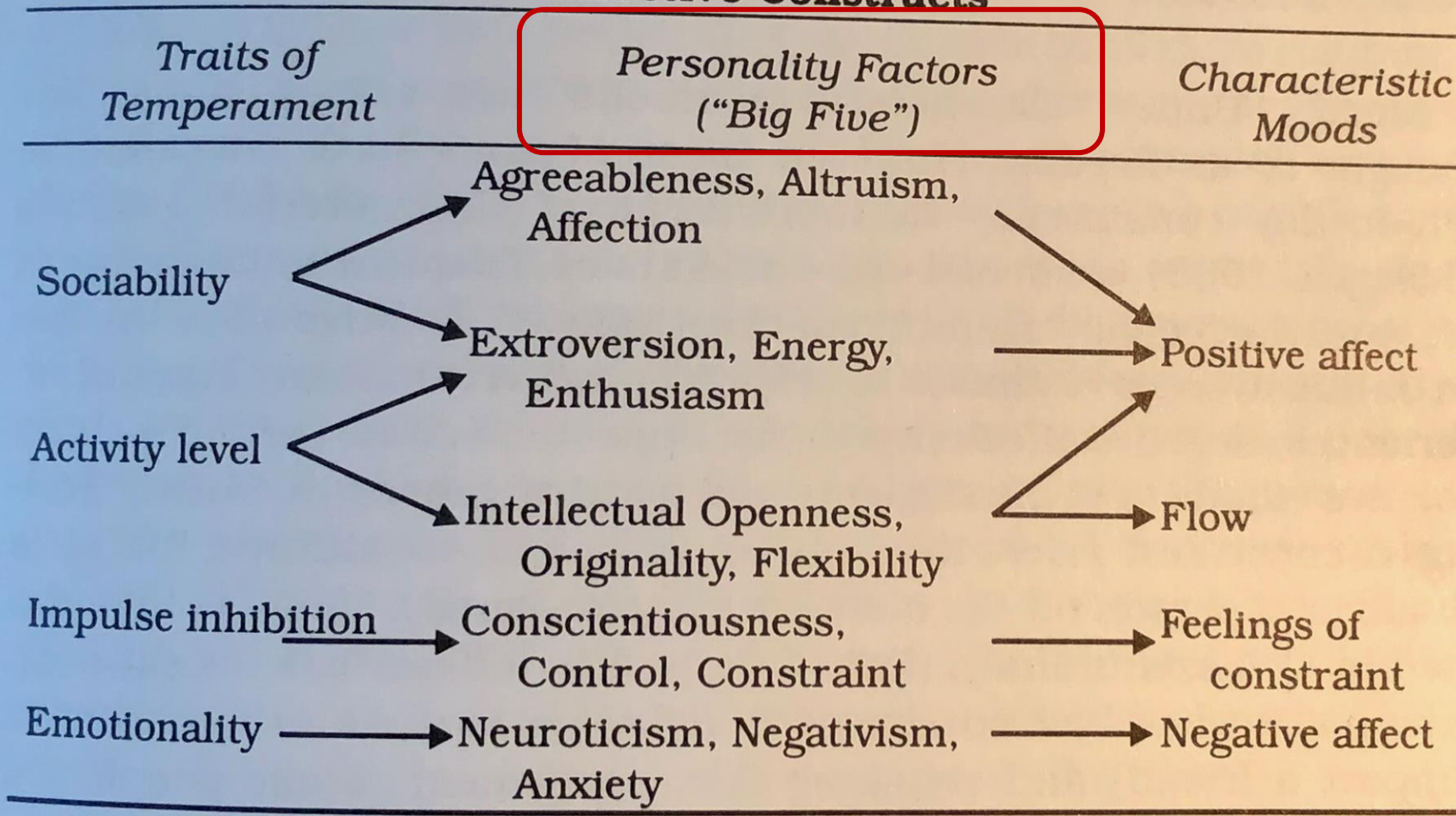


FIGURE 9–1. A Provisional Taxonomy of Individual Difference Constructs

TABLE 3.3

Affective Constructs



Note. From Snow, Corno, and D. Jackson (1996). Copyright 1996 by Macmillian. Adapted by permission.

Snow, Corno & Jackson, 1996

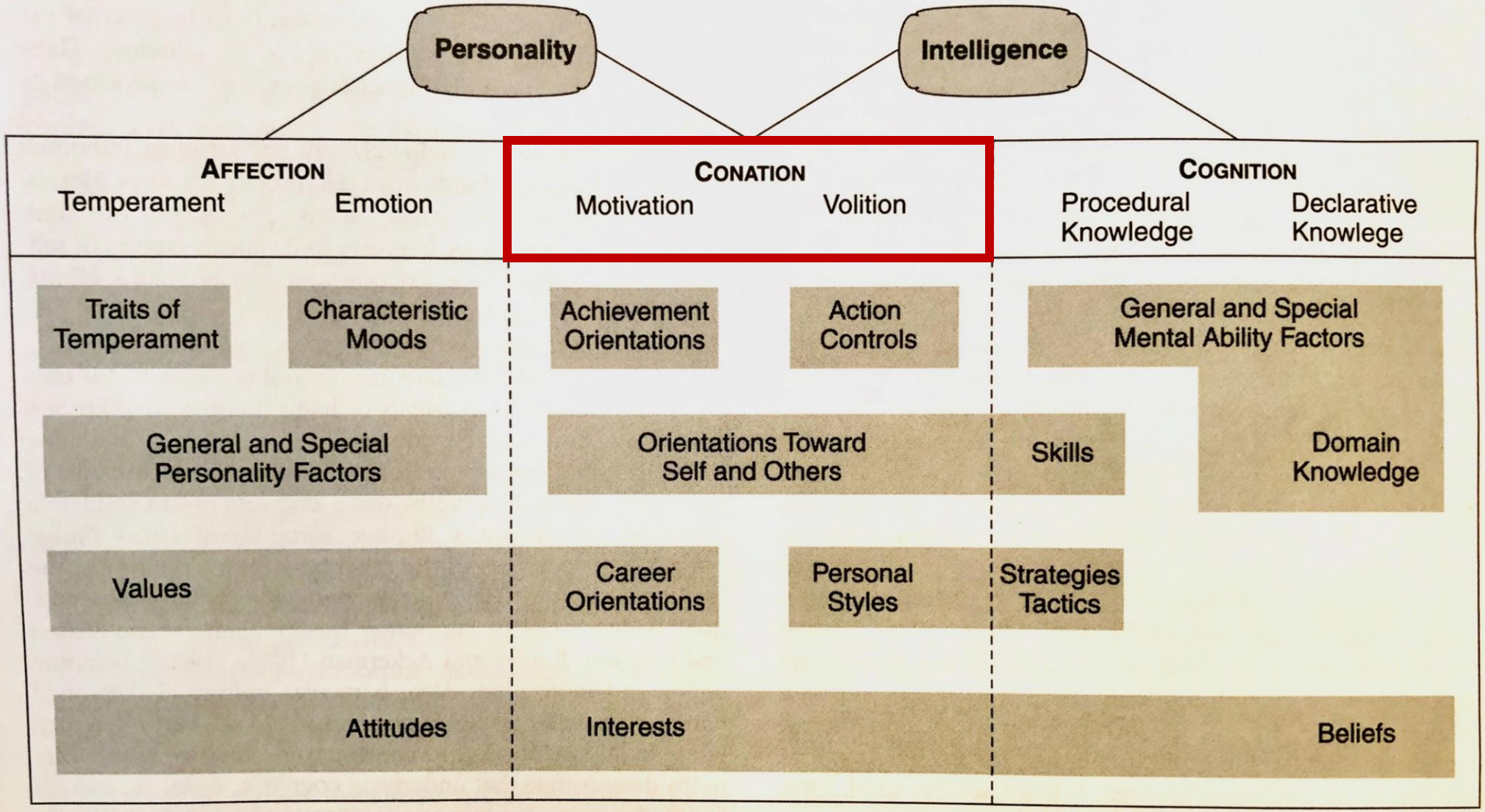
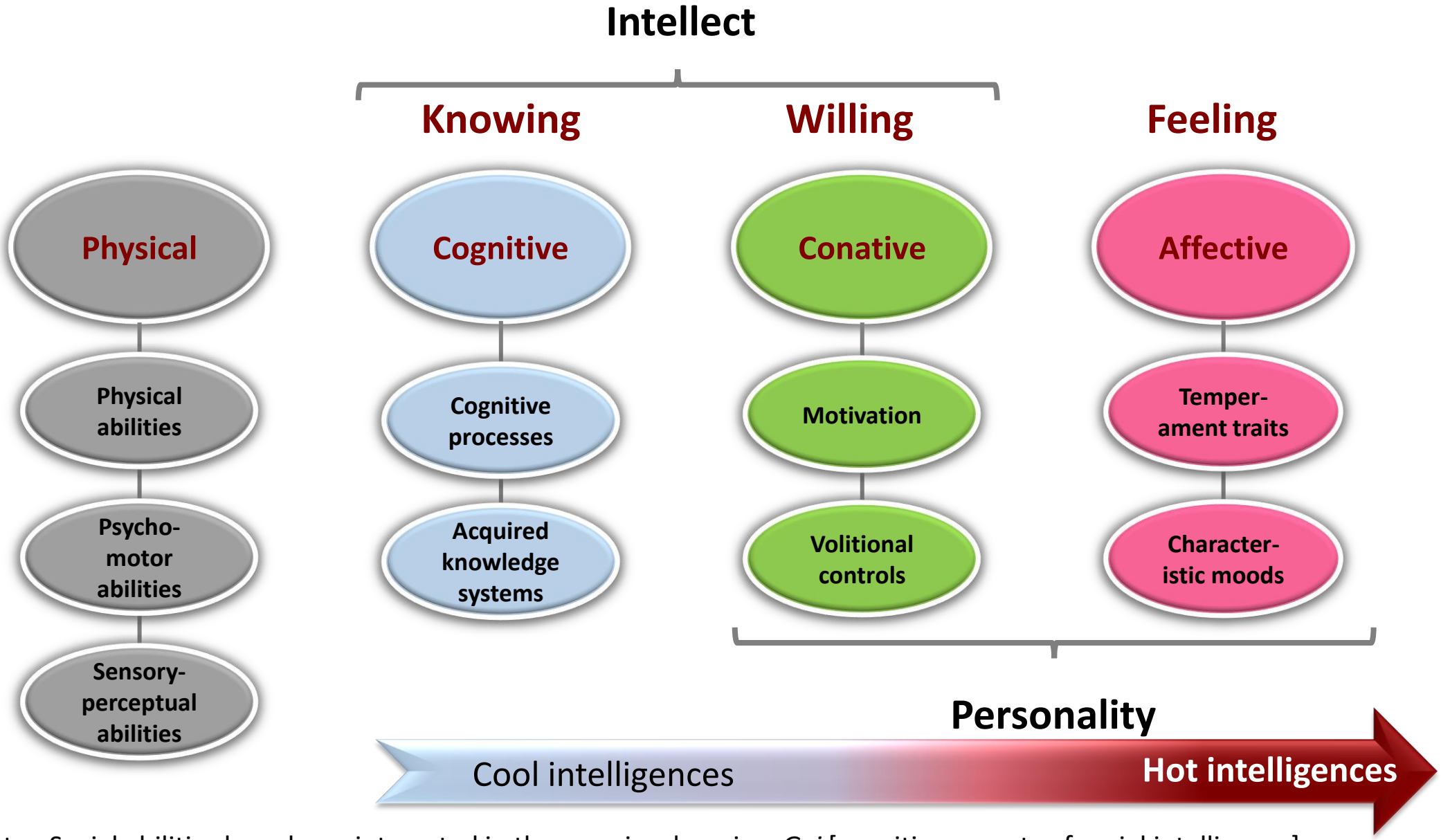


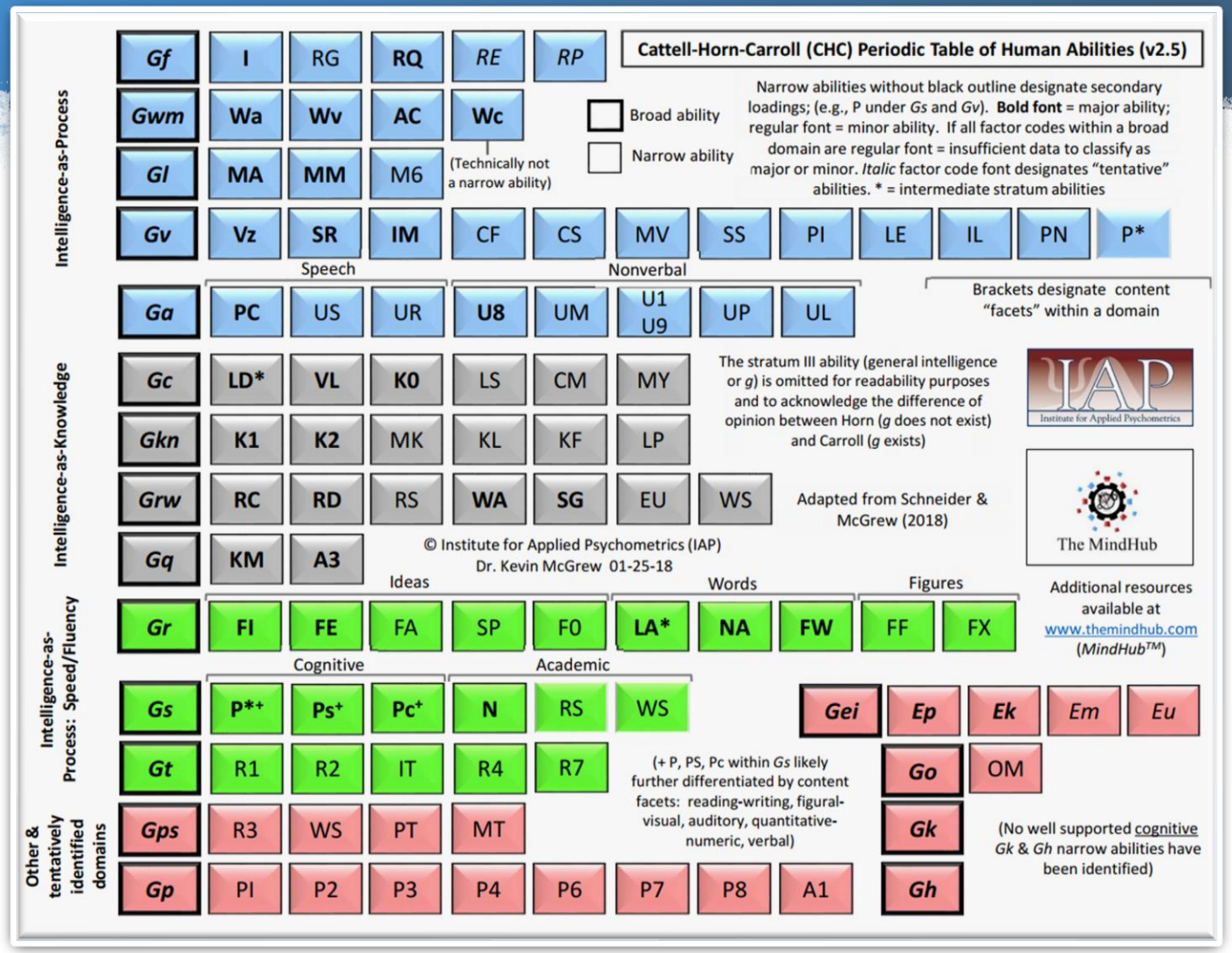
FIGURE 9–1. A Provisional Taxonomy of Individual Difference Constructs

The big picture: An adapted Snow (Corno et al., 2002) model of aptitude (MACM revised; 10-13-16)



(Note: Social abilities have been integrated in these major domains: *Gei* [cognitive aspects of social intelligence] now in Cognitive/CHC model. Social behavior characteristics now subsumed under personality).

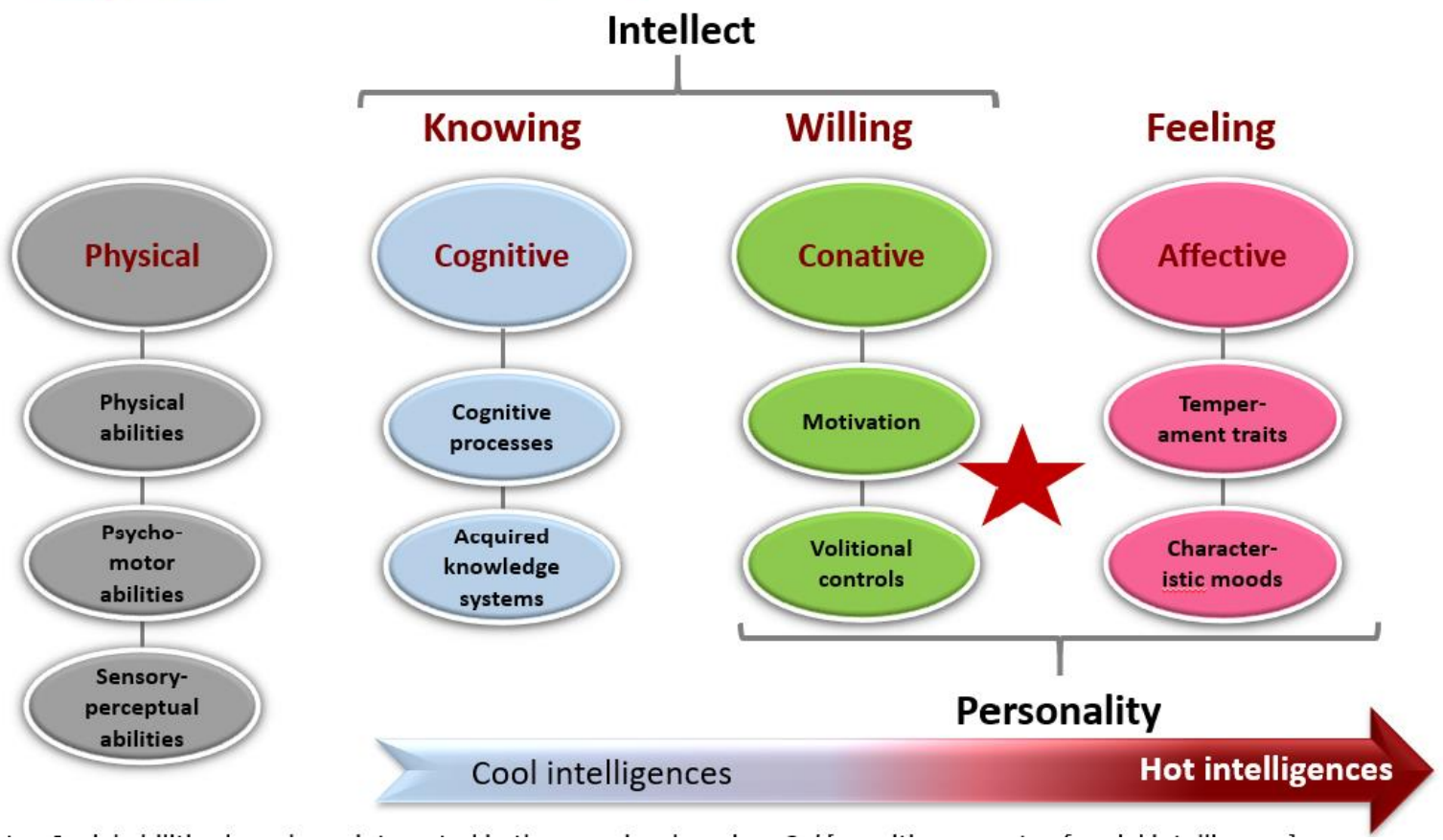
We have an embarrassment of riches—but a serious need to make order out of chaos

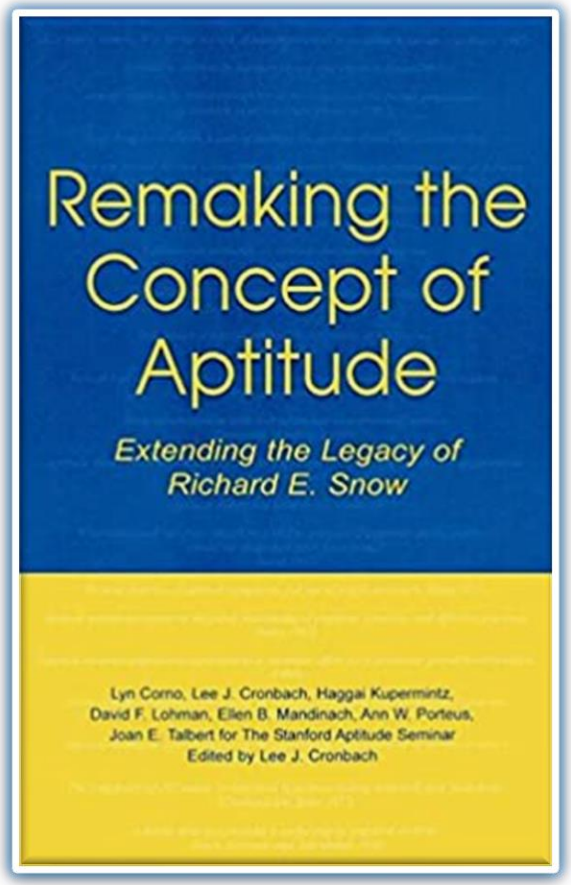


A major MACM goal is to facilitate the process of developing a **common nomenclature for these constructs**…like the CHC periodic table of cognitive elements

The big picture: Richard Snows concept of aptitude

The big picture: An adapted Snow (Corno et al., 2002) model of aptitude (MACM revised; 10-13-16)





The MACM model (combined with cognitive and affective constructs) and the *Crossing the Rubicon* "commitment pathway" to self-regulated learning model will be described in subsequent modules