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## Working Paper

# Non-cognitive skills and other related concepts: Towards a better understanding of similarities and differences

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Non-cognitive skills and other related concepts:  
towards a better understanding of similarities and  
differences

JRC Working Papers Series on  
Labour, education and Technology  
2021/09

Maria Cinque, Stephanie Carretero, Joanna Napierala

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# Non-cognitive skills and other related concepts

## Towards a better understanding of similarities and differences

Maria Cinque (LUMSA University - Italy), Stephanie Carretero (Joint Research Centre – European Commission), Joanna Napierala (Joint Research Centre – European Commission)

### **Abstract**

The aim of this working paper is to discuss the existing terminology, taxonomies, frameworks and concepts used for non-cognitive skills contained in the literature on labour market and skills published between 2009 and 2019, as well as in international policy driven research, with a specific focus on European frameworks. In the comparison of different Socio-emotional Learning (SEL) models we took advantage of the tools created by Harvard University (*Explore SEL*). Our perspective is descriptive rather than prescriptive as we compared the most important frameworks, highlighting the different perspectives of using dissimilar – and sometimes contrasting - terminologies, the labels and definitions. We suggest a three-dimensional taxonomy composed by the economic, the social and the humanity discourses as first dimension, the global, national and personal perspectives as a second one and the labour market, education policies, personal development drivers as a third one.

**Keywords:** Non-cognitive Skills, Big Five, Cognitive Skills, 21<sup>st</sup> Century Skills, Social and emotional skills, Labour market, Taxonomy, Framework

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## Introduction

Different studies have highlighted that, beyond knowledge, other skills related to individual patterns of behaviours, attitudes and personality traits are crucial both for professional success and for personal fulfilment. Nevertheless, the literature review shows that these skills can be found in researchers' discussions under different labels. Traditionally the literature related with labour economic recognise the importance of the term non-cognitive skills to refer to these set of skills. But we can also see that this term overlaps with other similar concepts such as socio-emotional skills, soft skills, transversal competences, social competences, '21st century skills', Key competences, generic competences, or even basic and life skills (Shapiro et al., 2011). '21st century skills' is for example, a term widely used by international research projects and institutions, whereas the Organisation for Economic Co-operation and Development (OECD) uses the term 'key competencies' (2003) or socio-emotional skills (2015). The Council of the European Union adopted the term “Key Competences for life-long learning” through which skills such as critical thinking, problem solving, teamwork, communication and negotiation skills, analytical skills, creativity, and intercultural skills are embedded (2006, 2018). Besides the names of these skills also change from one discipline to another, with preference of economists, as said, to use term non-cognitive skills, whereas 'socio-emotional skills' is preferred by psychologists, and 'soft skills' being mostly present in business and management or education studies (Sanchez Puerta et al., 2016).

This diversity in referencing to non-cognitive skills and other related concepts leads sometimes to confusion. The aim of this paper is therefore to discuss this variety of concepts in order to put some order in the different terminologies, to clarify their use and understanding in scientific and policy literature, without defending any specific concept or giving the supremacy of one against another. We aim to extend the previous clarification carried out on this topic by World Bank (Sanchez Puerta et al., 2016) by adding international and European policy driven research. We therefore:

- compare the most important frameworks on non-cognitive skills and similar concepts created by international institutions;
- analyse the labels, definitions and approaches to non-cognitive skills in a searchable and functional database containing papers extracted from a systematic literature review on labour market and skills (see Cabus et al., 2021);
- analyse the labels of the tools created to compare different Socio-emotional Learning (SEL) models carried out by Harvard University (*Explore SEL*).

## Comparison of different terms used in the frameworks referring to non-cognitive skills

The review and comparison of various competence frameworks, that are summarised in Table 1, allowed us the identification of different terms used to describe non-cognitive skills. We will introduce them in this section.

Some frameworks used the term competences instead of skills. As it is not the aim of this paper to enter into the discussion of both terminologies, it is important to note that different authors have already highlighted that skills and competences are frequently used imprecisely and interchangeably (see Rychen & Salganik, 2003; Murnane & Levy, 2001, p. 183). Consequently, both terms could be found when referring to the frameworks and we will respect the original names. Nevertheless, the term competence is broader than skills, as competence includes skills, knowledge and attitudes. We know that a reason for the lack of systematic use of one term or another could be a matter of language, as it has been indeed highlighted by the ESCO skills pillar taxonomy, saying that: “There is however no distinction between skills and competences. Each of these concepts comes with one preferred term and a number of non-preferred terms in each of the 27 ESCO languages<sup>1</sup>.”

Table 1: Different frameworks on skills/competences that embedded non-cognitive skills

Denomination	Examples
Generic Competences	Tuning Educational Structures (Wagenaar & González Ferreras, 2008)
Key Competences	UNESCO (1996), OECD (2003), EU (2006; 2018)
Life Skills/Competences*	WHO (1993), UNICEF (2010), JRC LifeComp (2020)
Transversal Skills	UNESCO (2015), ESCO (2019)
Transferable Skills	EC (European Commission), (Balcar et al., 2011)
21 <sup>st</sup> Century skills	OECD (2009), Partnership for 21st Century Learning (2015), World Economic Forum (2015)

Note: \* The JRC LifeComp refers to life competences

We found non-cognitive skills under the term “Generic Competences”, for example in the framework developed in the project on “Tuning Educational Structures” (Wagenaar & González Ferreras, 2008). As stated already by Cinque (2016), the expression ‘**generic competences**’ refers to those skills that are applicable and useful in various contexts, and thus they can be supposedly transferred among different work occupations. They include soft skills and additional abilities, such as literacy, numeracy, technology use, etc. Soft skills are considered a subset of generic skills.

Non-cognitive skills are also reflected under the expression **key competences**. Cinque (2016) observed that key competences refer to those generic skills that warrant special recognition for their outstanding importance and applicability to the various areas of human life (educational and occupational, personal and social). The words ‘generic’ and ‘key’ are sometimes used synonymously (Repetto Talavera & Perez-Gonzalez, 2007). Despite their differing conceptualisation and interpretation of the term in question, the majority of experts seem to agree that for a competence to deserve attributes such as ‘key’, ‘core’, ‘essential’ or ‘basic’, it must be necessary and beneficial to any individual and to society as a whole (Hoskins & Fredriksson, 2008).

<sup>1</sup> <https://ec.europa.eu/esco/portal/skill>



**Life skills** is also another term used extensively in which non-cognitive skills appeared. This terminology is used by different international institutions, like the World Health Organization (WHO), the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and the United Nations Children’s Fund (UNICEF). Even these organizations acknowledge that there is no universally accepted definition of life skills, they can be described as adaptive attitudes and behaviour to tackle life challenges (WHO, 1997). Sala et al. (2020) went beyond life skills and refer specifically to life competences in the LifeComp Framework (Sala et al., 2020). More details could be find in sub-section on “*European and International frameworks, models, and surveys*”.

Non-cognitive skills also appear in a study commissioned by the European Commission on the **transferability of skills** across different sectors (Balcar et al., 2011). Concretely, three categories of skills were identified: soft skills; generic hard skills; specific hard skills. Specific hard skills are characterised by their lower level of transferability, whereas soft skills and generic hard skills are skills with high transferability across sectors and occupations and can be identified as **transversal skills**.

**Transversal skills** are referred to as ‘skills that cross the borders of disciplines or occupations and capture generic skills, such as adaptability, abilities of communication, learning, and problem solving, as well as languages and competences in information and communication technologies’ (EC, 2014, p. 4). According to ESCO (2019), transversal knowledge, skills and competences are relevant to a broad range of occupations and economic sectors. They are ‘the cornerstone for the personal development of a person’ (p. 21).

Finally, non -cognitive skills are also assimilated to the so-called term of 21<sup>st</sup> century skills. We can find many different versions of the **21st century skills** framework (Ananiadou & Claro, 2009; Partnership for 21st Century Learning, 2015; World Economic Forum, 2015). Comparing them, we can observe that 21st century skills focus on higher-order thinking, problem solving, effective communication, self-directed and collaborative learning, required by a global and digital society.

## **Non-cognitive skills and other related concepts in the literature on labour market outcomes**

In this part of the paper, our analysis we will take advantage of the searchable and functional database of articles created via the systematic literature review of articles published in English between 2009 and 2019. This review focused on articles on non-cognitive skills and outcomes on the labour market, on the one hand, and literature on broadly understood personality traits and outcomes on the labour market on the other hand (see Cabus et al. 2021 for more details on methodology). The final version of database includes 117 articles from different geographical areas, mainly from the US (30 articles), Germany (10 articles), United Kingdom (6 articles), Sweden (5 articles), Australia (4 articles), with a greater share of articles being published in the last four years (2016-2019). The authors have different backgrounds, with the majority of articles written by economists (50 articles), psychologists (20) and sociologists (9).

While analysing these articles we extracted concepts, definitions and classifications of non-cognitive skills and other related concepts. The term competence was rarely used as the majority of the articles focused on skills, traits and personality. Just by exploring the keywords, the frequencies of the most recurrent words are the following:

- *skill(s)* - 118
- *non-cognitive* – 45
- *personal (attributes, characteristics etc.)* – 36

- *personality traits* – 29

We compared used concepts referring to skills in order to organise the existing knowledge in a sound terminology.

One basic definition of non-cognitive skills is provided by Anghel (2017), that used data coming from the Programme for the International Assessment of Adult Competencies (PIAAC) to construct several measures of non-cognitive skills and to analyse the relationship between non-cognitive skills and earnings. His definition of non-cognitive skills focuses on the fact that they are not directly related to an individual’s own knowledge:

***Non-cognitive skills*** (also known as *soft skills* or *socio-emotional skills*) are individual patterns of behaviors, attitudes and personality that are not directly related to individuals’ knowledge (Anghel, 2017, p. 4)

As Acosta and colleagues (2015) remark, the term non-cognitive skills is mainly used in the economic literature as synonyms of different kind of skills (socio-emotional/soft/life skills), although psychologists claim that these skills are not deprived of cognition:

*In the economic literature, the term socio-emotional skills is often used interchangeably with the terms of behavioural skills, life skills, non-cognitive skills, or soft skills. Nonetheless, these terms differ slightly and merit clarification. Non-cognitive skills refers to a broad range of behaviors, abilities, and traits that are not induced by intelligence or achievement. Soft skills and life skills usually include more technical skills such as language fluency and computer literacy [...]. Psychologists argue that many of the abilities and traits that economists intend to capture by use of the term non-cognitive skills are a result of cognition (Acosta et al., 2015, p. 4).*

In the same article, Acosta et al. (2015) use the term socio-emotional skills, adopting the definition of Guerra et al. (2014) but also extending it to the personality traits (which creates a little confusion):

*The term socio-emotional skills refers to a distinct set of skills that enable individuals to navigate interpersonal and social situations effectively [...]. These skills encompass behaviors and attitudes that are consistent patterns of thoughts, feeling, and conduct (such as commitment, discipline, or the ability to work in a team) and personality traits (such as self-confidence, perseverance, and emotional stability) that are broad facets relatively stable over time (Acosta et al., 2015, p. 4)*

In a more recent article, Acosta & Muller (2018) distinguish between personality traits and socio-emotional skills:

*Economists commonly consider behavioral characteristics and personality traits under the umbrella of ‘non-cognitive skills’ or leave the distinction unexplained. Socio-emotional skills are understood here as behaviors and attitudes (commitment, discipline, ability to work in a team and determination) while personality traits designate a range of personal facets that are relatively stable over time (self-confidence, sociability, emotional stability, among others). Personality traits are broad facets defining an individual. They influence socio-emotional skills as reactions.*

A further distinction and, also, an attempt to analyse the relationship between personality traits (also called ‘qualities’) and soft skills has been illustrated by Adhitya et al. (2019). Balcar (2016) also highlighted the difference between these two concepts – soft skills and psychological traits –, highlighting that the second ones are also called non-cognitive abilities. He describes further this

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distinction focusing on the difference between ‘predisposition’ and ‘ability’ (two terms that he does not explain):

*The difference between these two categories can be illustrated by the distinction between communicativeness (a predisposition) and the ability to communicate effectively in a work environment (a soft skill) because even a person with a low degree of communicativeness can be a very good communicator (owing to knowledge of appropriate methods and tools) and can, for example, transmit complex information to others without any bias. [...] Moreover, some soft skills are more closely connected with cognitive than non-cognitive abilities (e.g. problem solving, planning and organising or exploring and orientation in information). (Balcar, 2016, p. 454)*

The differences between hard and soft skills are highlighted by Balcar & Hedija (2019), saying that hard skills are related to knowledge and can be easily trained and measured, while soft skills are “more closely related to attitudes, being their development slower and more difficult”. Gutman and Schoon (2013) highlight that the term ‘non-cognitive’ creates a false dichotomy “between cognitive abilities and what are often seen as psychosocial or soft skills ..” It is confusing to contrast cognitive and non-cognitive factors as ‘few aspects of human behaviour are devoid of cognition’...

The relationship between cognitive and non-cognitive skills is also highlighted by Almlund et al. (2011), who quotes Binet (the inventor of the IQ test in order to prove that these concepts are closely interconnected:

*Alfred Binet the creator of the first IQ test (the Stanford-Binet test), noted that: [Success in school] ...admits of other things than intelligence; to succeed in his studies, one must have qualities which depend on attention, will, and character; for example, a certain docility, a regularity of habits, and especially continuity of effort. A child, even if intelligent, will learn little in class if he never listens, if he spends his time in playing tricks, in giggling, in playing truant. (Almlund et al. 2011, p. 15).*

Heckman & Kautz (2012) highlight the relationship between the Big Five personality traits and their ‘facets’ as non-cognitive skills, i.e. their visible aspects that can be measured and assessed (Table 2).

Table 2. Examples of the relationship between the big five personality traits and their ‘facets’

Big Five Personality Factor	APA Dictionary Description	Facets (and correlated traits and adjectives)	Related traits	Analogous Childhood Temperament Traits
<b>Conscientiousness</b>	‘the tendency to be organized, responsible, and hardworking’	Competence (efficient), Order (organized), Dutifulness (not careless), Achievement striving (ambitious), Self-discipline (not lazy), Deliberation (not impulsive)	Grit, Perseverance, Delay of gratification, Impulse control, Achievement striving, Ambition and Work ethic	Attention / (lack of) distractibility, Effort control, Impulse control / delay of gratification, Persistence, Activity

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<b>Openness Experience</b>	to ‘the tendency to open to new aesthetic, cultural, or intellectual experience’	Fantasy (imaginative), Aesthetic (artistic), Feelings (excitable), Actions (wide interests), Ideas (curious), and Values (unconventional)	Sensory sensitivity, Pleasure in low-intensity activities, Curiosity
<b>Extraversion</b>	‘an orientation of one’s interests and energies toward the outer world of people and things than the inner world of subjective experience, characterized by positive affect and sociability’	Warmth (friendly), Gregariousness (sociable), Assertiveness (self-confident), Activity (energetic), Excitement seeking (adventurous), and Positive emotions (enthusiastic)	Surgency, Social dominance, Social vitality, Sensation seeking, Activity, Positive emotionally, and Sociability/affiliation

Source: Elaborated from Heckman & Kautz, 2012

In another recent article, not included in the database, Heckman et al. (2019) highlight that the economic analysis clarifies psychological studies by establishing that psychological attributes are measured by performance on tasks. Nevertheless, as Heckman et al. (2019) admits, inferring skills from performance on tasks requires standardizing all the other contributing factors that produce the observed performance. The inability to parse and localize behaviours that depend on a single skill or ability gives rise to a fundamental problem of assessing the contribution of any particular skill to the successful performance on any task (or measure). Psychological attributes have different productivities in different tasks. Performance on tasks depends on incentives and multiple skills, giving rise to a fundamental identification problem when measuring any single skill. Furthermore, Heckman, Jagelka & Kautz (2019) note that the importance of cognitive and non-cognitive skills increases with the complexity of a task. The labour market rewards are increasing for those who have large bundles of both social and cognitive skills. Skills are stable across situations. However, their manifestations depend on incentives to apply effort in the situations where they are measured and also on other skills.

Nevertheless, as Heckman observes, skills are not set in stone. They change over the life cycle and can be enhanced by education, mentoring, parenting, and environmental influences, with different degrees at different ages.

Similarly, thinking in a development perspective, another article by Almlund et al. (2011) shows that personality traits are the relatively enduring patterns of thoughts, feelings, and behaviours that reflect the tendency to respond in certain ways under certain circumstances. The authors use Roberts’s Model of Personality (Fig. 1) to show how complex and challenging is the measurement of personality traits based on observed behaviours.

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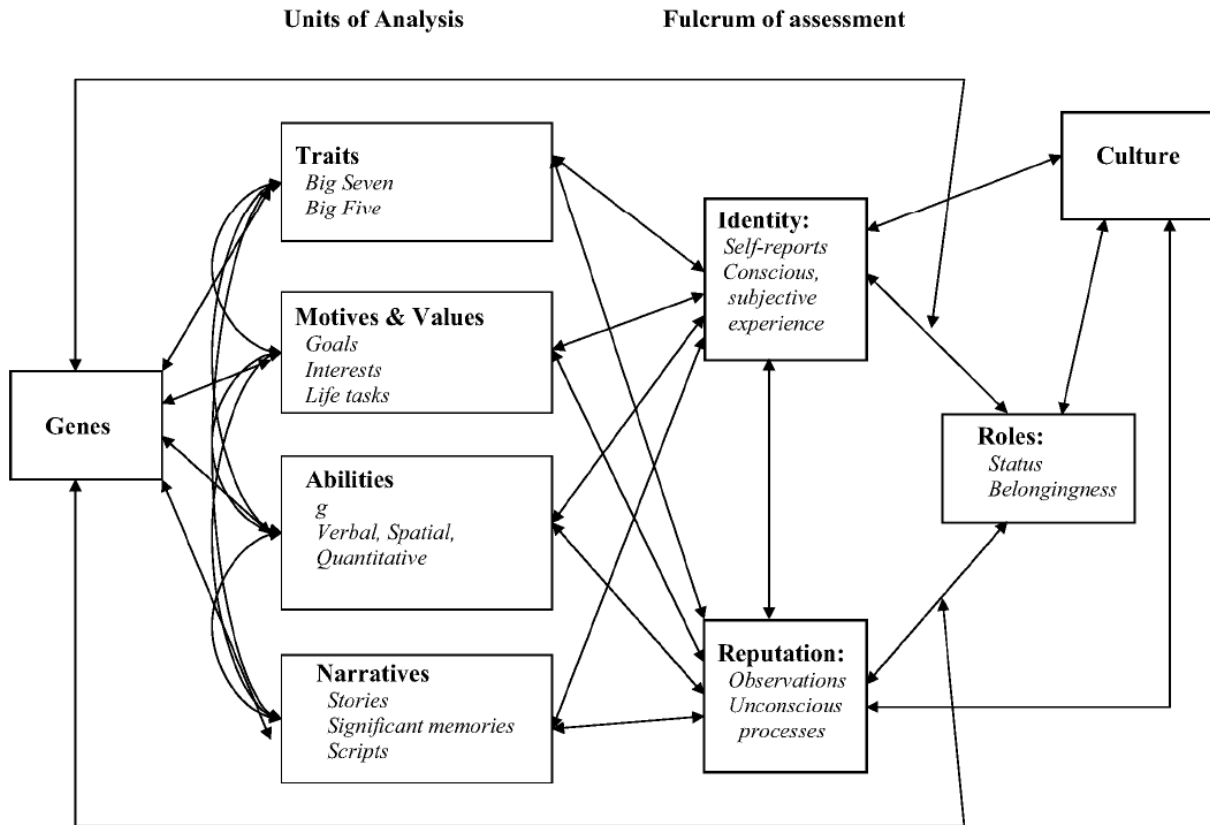


Figure 1: Robert's Model of Personality as the Output System

Source: Almlund et al. (2011) – based on Roberts (2006)

Lundberg (2017) states that personality traits are strongly heritable, and in studies of twins the findings show that 40–60 percent of variation in personality is genetic. Advances in neuroscience, molecular biology, developmental psychology, and economics are beginning to link deficits in a broad range of behavioural, health, and cognitive abilities to early experiences and environmental conditions, including toxic stress and pollution (Shonkoff et al. 2012; Currie 2011). Lundberg (2017) also reports that many studies have objected to the use of the label ‘non-cognitive’ skills. This author explains that this is because behaviours such as task persistence and effective social interaction require cognitive input in a way that is not clearly distinct from the cognitive demands of completing a Raven’s Matrices test (intelligence test). The unifying principle in this view of human skills is the psychological concept of executive functioning, an umbrella term for the management of cognitive processes. The role of the executive function in regulating behaviour will vary depending on circumstances and developmental stages, but the consistent importance of cognitive control in shaping a broad range of capabilities highlights the inaptness of the term ‘non-cognitive.’

## Relevant studies towards a taxonomy of skills

### *European and International frameworks, models, and surveys*

In this part, we present and describe other international programs or frameworks that are related to non-cognitive skills or other similar concepts, including the EU policy frameworks, such as EntreComp (Bacigalupo et al., 2016) and LifeComp (Sala et al., 2020). We compare them highlighting differences and similarities across them. Each of these frameworks was created with a specific purpose and the

final goal is very important in understanding the vision and their structure. Some frameworks were created for the development of curricula, some were conceived as tools to measure/assess the quality of education and to foster inclusion and economic growth, or to explore how broader policy, cultural and socio-economic contexts influence these skills. More recent frameworks also stress the importance of values and attitudes and the role of individuals in influencing people, events and circumstances around them for better agency.

The **World Bank’s STEP Skills Measurement Program (STEP)** is an initiative created in 2014 to measure skills in low and middle-income countries<sup>2</sup>. As explained on the website<sup>3</sup>, STEP “provides policy-relevant data to enable a better understanding of skill requirements in the labour market, backward linkages between skills acquisition and educational achievement, personality, and social background, and backward linkages between skills acquisition and living standards, reductions in inequality and poverty, social inclusion, and economic growth”. STEP Surveys measure three broad categories of skills: cognitive skills, socio-emotional skills and job relevant skills.

In 2015, the **World Economic Forum** published a report that focused on the pressing issue of the 21<sup>st</sup>-century skills gap and ways to address it through technology (*New Vision for Education: Unlocking the Potential of Technology*). In that report, WEF defined a set of 16 crucial proficiencies for education in the 21<sup>st</sup> century. Those skills include six ‘foundational literacies’, such as literacy, numeracy and scientific literacy, 4 skills that were labelled as ‘competencies’ and 6 skills named ‘character qualities’. Competencies are the means by which students approach complex challenges; they include collaboration, communication, critical thinking and problem-solving. Character qualities are the ways in which students approach their changing environment; they include curiosity, adaptability and social and cultural awareness.

The OECD study "**Skills for Social Progress, the Power of Social and Emotional Skills**" (2015) aims to analyse how social and emotional skills affect the future "economic and social outcome" of children and how education systems can foster these skills. It examines the effects of skills on a variety of measures of individual well-being and social progress, which covers aspects of our lives that are as diverse as education, labour market outcomes, health, family life, civic engagement and life satisfaction. The report also discusses how policy makers, schools and families facilitate the development of socio-emotional skills through intervention programmes, teaching and parenting practices. The authors highlight that education systems should not only be seen as a social investment or be purely outcome orientated, instead they should enable people to increase their well-being and support social inclusion.

The Entrepreneurship Competence Framework – **EntreComp**- (Bacigalupo et al., 2016) is based on one of the key competences identified by the European Commission necessary for a knowledge-based society: the sense of initiative and entrepreneurship. The EntreComp framework consists of three interrelated and interconnected competence areas: ‘Ideas and opportunities’, ‘Resources’ and ‘Into action’. Each of the areas is made up of five competences, which, together, constitute the building blocks of entrepreneurship as a competence. The framework can be used as a basis for the development of curricula and learning activities fostering entrepreneurship as a competence. Also, it

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<sup>2</sup> The STEP collection currently hosts data collected between March 2012 and August 2017 in Albania, Armenia, Azerbaijan, Bolivia, Bosnia & Herzegovina, Colombia, Georgia, Ghana, Kenya, Kosovo, Lao PDR, Macedonia, Serbia, Sri Lanka, Ukraine, Vietnam, and the Yunnan Province in China.

<sup>3</sup> <https://microdata.worldbank.org/index.php/catalog/step/about>

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can be used for the definition of parameters to assess learners’ and citizens’ entrepreneurial competences.

The **OECD Study on Social and Emotional Skills** (2017) is an international survey that identifies and assesses the conditions and practices that foster or hinder the development of social and emotional skills for 10- and 15-year-old students. The study aims at:

- providing information about students’ social and emotional skills in different countries;
- identifying factors in students’ home, school and peer environments that promote or hinder the development of social and emotional skills;
- exploring how broader policy, cultural and socio-economic contexts influence these skills.

The framework includes 19 social and emotional skills, that are clustered in six groups, based on the well-known Big Five model, although modifying the names of some domains and adding further items: task performance, emotional regulation, collaboration, open-mindedness, engaging with others, additional indices. The study is based on the triangulated assessment, i.e. it assesses students’ social and emotional skills combining three sources of information: students’ self-reports and reports by parents and teachers.

In 2018 the **OECD** created another model, the **Learning Compass 2030**<sup>4</sup>, an evolving learning framework that sets out an aspirational vision for the future of education. The metaphor of a learning compass was adopted to emphasise the need for students to learn to navigate by themselves through unfamiliar contexts. The OECD Learning Compass 2030 is neither an assessment framework nor a curriculum framework. It recognises the intrinsic value of learning by elaborating a wide range and types of learning within a broad structure and acknowledges that learning does not only happen in school. The framework includes cognitive and meta-cognitive skills (e.g. critical thinking, creative thinking, learning to learn and self-regulation); social and emotional skills (e.g. empathy, self-efficacy and collaboration); and practical and physical skills (e.g. using new information and communication technology devices). The components of the compass also include core foundations, knowledge, skills, attitudes and values, transformative competencies and a cycle of anticipation, action and reflection. The concept of student agency is central to the Learning Compass 2030, as the compass is a tool that students can use to orient themselves as they exercise their sense of purpose and responsibility while learning to influence the people, events and circumstances around them for the better.

The **Council of Europe** developed a **Reference Framework of Competences for Democratic Culture** (Barrett, 2016), to be adapted for use in primary and secondary schools and higher education and vocational training institutions throughout Europe as well as national curricula and teaching programmes. The framework includes 20 competences divided into four areas – Values, Attitudes, Skills and Knowledge, Critical understanding. The heart of the Framework is a model of the competences that need to be acquired by learners if they are to participate effectively in a culture of democracy and live peacefully together with others in culturally diverse democratic societies.

In May 2018, the **Council of the European Union** adopted the revised **Recommendation on Key Competences for Lifelong Learning**. The aim is that everybody should have the essential set of competences needed for personal development, social inclusion, active citizenship, and employment. These competences include Literacy, Multilingual, Mathematical competence and competence in

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<sup>4</sup> <http://www.oecd.org/education/2030-project/teaching-and-learning/learning/learning-compass-2030/>

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science, technology and engineering, as well as Digital, Personal, Social and Learning to Learn, Citizenship, Entrepreneurship, and Cultural awareness and expression.

In 2020 the **Joint Research Centre (JRC)** of the European Commission developed the European Framework for Personal, Social, and Learning to Learn Key Competence – **LifeComp** – (Sala et al., 2020), a conceptual framework for the “Personal, Social, and Learning to Learn”, that was already illustrated earlier (see section on “Comparing different terminologies...”) and is illustrated here again in order to highlight similarities and differences with similar international frameworks. The framework has undergone several consultations, over the course of which, the consensus was to come up with three areas encompassing three competences each. Every competence has three descriptors, following a model ‘**awareness, understanding, action**’.

From the chronological comparison of the frameworks, models and surveys, we can observe that the most recent one are focused on a dynamic vision of skills, stressing the importance of values and attitudes and the role of individuals as agent of changes in the democratic society.

*Table 3. Frameworks, models and surveys covering non-cognitive skills*

<b>INSTITUTION</b>	<b>NAME</b>	<b>SKILLS COVERED</b>
<b>World Bank, 2014</b>	<i>STEP Survey</i>	<p><i>Cognitive skills</i></p> <ul style="list-style-type: none"> <li>- Reading proficiency (direct measurement)</li> <li>- Reading-Writing-Numeracy (indirect assessment)</li> </ul> <p><i>Socio-emotional skills</i></p> <ul style="list-style-type: none"> <li>- Personality traits (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism, Grit)</li> <li>- Behaviour (Hostile attribution, Decision making)</li> <li>- Risk and time preferences (Risk taking preferences, Time preferences)</li> </ul> <p><i>Job relevant skills</i></p> <ul style="list-style-type: none"> <li>- Qualifications required for the job and job learning times (Qualification requirements for current job; Learning times)</li> <li>- Indirect assessment of skills used at work (Autonomy and repetitiveness, Computer use, Contact with clients, Solving and learning, Supervision, Physical tasks).</li> </ul>
<b>World Economic Forum, 2015</b>	<i>New Vision for Education</i>	<p><i>Foundational literacies</i></p> <ol style="list-style-type: none"> <li>1. Literacy</li> <li>2. Numeracy</li> <li>3. Scientific literacy</li> <li>4. ICT literacy</li> <li>5. Financial literacy</li> <li>6. Cultural and civic literacy</li> </ol> <p><i>Competencies</i></p> <ol style="list-style-type: none"> <li>7. Critical thinking/problem solving</li> <li>8. Creativity</li> <li>9. Communication</li> <li>10. Collaboration</li> </ol> <p><i>Character qualities</i></p> <ol style="list-style-type: none"> <li>11. Curiosity</li> </ol>



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		<p>12. Initiative  13. Persistence &amp; grit  14. Adaptability,  15. Leadership  16. Social and cultural awareness.</p>
<b>OECD 2015</b>	<i>Skills for Social Progress</i>	<p><i>Achieving goals</i></p> <ul style="list-style-type: none"> <li>- Perseverance</li> <li>- Self-control</li> <li>- Passion for goals</li> </ul> <p><i>Working with others</i></p> <ul style="list-style-type: none"> <li>- Sociability</li> <li>- Respect</li> <li>- Caring</li> </ul> <p><i>Managing Emotions</i></p> <ul style="list-style-type: none"> <li>- Self-esteem</li> <li>- Optimism</li> <li>- Confidence</li> </ul>
<b>JRC 2016</b>	<i>EntreComp</i>	<p><i>Ideas and opportunities</i></p> <ul style="list-style-type: none"> <li>- Spotting opportunities</li> <li>- Learners can find opportunities to generate value for others.</li> <li>- Creativity</li> <li>- Vision</li> <li>- Valuing ideas</li> <li>- Ethical and sustainable thinking</li> </ul> <p><i>Resources</i></p> <ul style="list-style-type: none"> <li>- Self-awareness and self-efficacy</li> <li>- Motivation and perseverance</li> <li>- Mobilising resources</li> <li>- Financial and economic literacy</li> <li>- Mobilising others</li> </ul> <p><i>Into action</i></p> <ul style="list-style-type: none"> <li>- Taking the initiative</li> <li>- Planning and management</li> <li>- Coping with uncertainty, ambiguity and risk</li> <li>- Working with others</li> <li>- Learning through experience</li> </ul>
<b>OECD 2018</b>	<i>Study on Social and Emotional Skills (SSES)</i>	<p><i>Task Performance</i></p> <ul style="list-style-type: none"> <li>• Achievement Orientation</li> <li>• Responsibility</li> <li>• Self-Control</li> <li>• Persistence</li> </ul> <p><i>Emotional Regulation</i></p> <ul style="list-style-type: none"> <li>• Stress Resistance</li> <li>• Optimism</li> <li>• Emotional Control</li> </ul> <p><i>Collaboration</i></p> <ul style="list-style-type: none"> <li>• Empathy</li> <li>• Trust</li> <li>• Co-Operation</li> </ul>

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		<p><i>Open-Mindedness</i></p> <ul style="list-style-type: none"> <li>• Tolerance</li> <li>• Curiosity</li> <li>• Creativity</li> </ul> <p><i>Engaging with others</i></p> <ul style="list-style-type: none"> <li>• Sociability</li> <li>• Assertiveness</li> <li>• Energy</li> </ul> <p><i>Compound Skills</i></p> <ul style="list-style-type: none"> <li>• Self-Efficacy</li> <li>• Critical Thinking/Independence</li> </ul>
<b>OECD, 2018</b>	<i>The Learning Compass 2030</i>	<p><i>Cognitive and meta-cognitive skills</i></p> <ul style="list-style-type: none"> <li>• critical thinking</li> <li>• creative thinking</li> <li>• learning-to-learn</li> <li>• self-regulation</li> </ul> <p><i>Social and emotional skills</i></p> <ul style="list-style-type: none"> <li>• empathy</li> <li>• self-efficacy</li> <li>• responsibility</li> <li>• collaboration</li> </ul> <p><i>Practical and physical skills</i></p> <ul style="list-style-type: none"> <li>• using new information and communication technology devices</li> <li>• play musical instruments, craft artworks, play sports;</li> <li>• life skills, such as the ability to dress oneself, prepare food and drink, keep oneself clean</li> <li>• the ability to mobilise one’s capacities, including strength, muscular flexibility and stamina</li> <li>• manipulate materials, tools, equipment and artefacts to achieve particular outcomes</li> </ul>
<b>Council of Europe, 2018</b>	<i>Reference Framework Competences Democratic Culture</i>	<p><i>Values</i></p> <ul style="list-style-type: none"> <li>• dignity, cultural diversity, democracy</li> </ul> <p><i>Attitudes</i></p> <ul style="list-style-type: none"> <li>• respect, openness, civic mindedness, responsibility, self-efficacy, tolerance of ambiguity</li> </ul> <p><i>Skills</i></p> <ul style="list-style-type: none"> <li>• autonomous learning skills, analytical &amp; critical thinking skills, listening &amp; observing, empathy, adaptability, communication &amp; plurilingual skills, cooperation, conflict resolution.</li> </ul> <p><i>Knowledge and critical understanding of communication, self, the world.</i></p>
<b>JRC, 2020</b>	<i>LifeComp</i>	<p><i>the personal area</i></p> <ul style="list-style-type: none"> <li>• self-regulation</li> <li>• flexibility</li> <li>• wellbeing</li> </ul>

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<p><i>the social area</i></p> <ul style="list-style-type: none"><li>• empathy</li><li>• communication</li><li>• collaboration</li></ul> <p><i>the learning to learn area</i></p> <ul style="list-style-type: none"><li>• growth mindset</li><li>• critical thinking</li><li>• managing learning</li></ul>
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### *A different perspective: Harvard Explore SEL (Socio-Emotional Learning)*

The frameworks described in the previous part are the products of policy-driven research, commissioned by institutional bodies in order to influence education, to measure learning outcomes or to assess workers’ competencies/skills. A different perspective is represented by the frameworks created by different organisations and focused on Socio-Emotional Learning (SEL), that have been analysed by Harvard University<sup>5</sup>.

The website includes 40 different frameworks and gives the possibility to:

- explore domain focus (i.e., see how much each framework focuses on six common areas);
- discover framework connections (i.e., see where skills in one framework are related with skills in another one);
- identify related skills (i.e., see where similar SEL skills appear across frameworks).

We used these tools on the website for two purposes:

- 1) to compare frameworks, both within the Explore SEL domain and between those frameworks and the ones collected in the previous sub-section (that are not included in this initiative);
- 2) to create repertoires of terminology to be ‘classified’ according to the final taxonomy.

By comparing the frameworks, we observed that the majority of these frameworks include the **cognitive, emotional, social, values, perspective and identity domains**. Most frameworks include all the six domains, but some of them focus only on specific domain. For example, the **Emotional Intelligence model** (Mayer & Salovey, 1997; Mayer, Salovey & Caruso, 2008; Mayer, Caruso & Salovey, 2016) only includes three domains: the cognitive domain (7%), the emotional domain (87%) and the perspective domain (6%)<sup>6</sup>. The **Big Five Personality Traits model** (McCrae & John, 1992; John, Naumann & Soto, 2008) does not include neither cognitive skills nor the identity domain. It includes values (42%), social skills (21%), perspective (21%), emotion (15%). It is the only framework that does not include cognitive skills.

As far as the second task is concerned, we extracted 247 terms from the different frameworks. We used them to start creating a glossary, where the terms are ‘classified’ not only within their frameworks but also indicating synonyms and similarities with other terms and creating a link with character skills and personality traits.

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<sup>5</sup> All frameworks can be compared by using a tool available on the website <http://exploresel.gse.harvard.edu>.

<sup>6</sup> In the graph the number is 7%; this is probably due to the rounding of decimal numbers.

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Table 4. Example of Glossary based on the analysis of terms extracted from Harvard Explore SEL

TERM	DEFINITION	SOURCE	SYNONYMS	CHARACTER STRENGTHS	PERSONALITY TRAITS
<i>academic tenacity</i>	The beliefs and skills that allow students to look beyond short-term concerns to longer-term or higher-order goals and withstand challenges and setbacks to persevere toward these goals.	Building Blocks for Learning	Persistence (Social and Emotional Skills: Well-being, connectedness and success)	grit, self-control	conscientiousness
<i>accepting differences</i>	Being open-minded and accepting of ideas, cultures, and ways of doing things that are different from his or her own	ACT Holistic Framework	Cultural competence (40 Developmental Assets for Adolescents (ages 12-18)	curiosity	openness to experience

In order to overcome the problems caused by terminological abundance and, sometimes, confusion created by the different **SEL frameworks**, one proposal toward a taxonomy of SEL was already made by OECD in 2017 and by the SEL Assessment Group in 2018. The Group for the Assessment of SEL (Muraro et al., 2018) already stated that<sup>7</sup>: “the Big Five framework can be seen as a kind of ‘Rosetta Stone’, a well-established taxonomy to which essentially all social and emotional skills can be classified. Using this taxonomy as a framework is desirable because the Big Five factors are backed by decades of empirical support, show consistent relationships with desirable outcomes such as success at school and in the workforce, and are cross-culturally universal. Moreover, there is evidence that skills within these factors are malleable to change both across the lifespan and via deliberate intervention. Organizing social and emotional skills into these five ‘buckets’ gives us a parsimonious, yet comprehensive, way of conceptualizing different social and emotional skills and capturing validity evidence. Because of these advantages, large-scale studies like the OECD Study on Social and Emotional Skills (2017) use this model as their assessment framework”. Muraro et al. (2018) associated in a different way the Big Five traits with the related skills and the correspondence between the area identified by OECD and the ‘domains’ included in the Big Five Model is the following:

<sup>7</sup> <https://casel.org/use-big-five-model-sel-assessment-framework/>

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- *open-mindedness* (corresponding to ‘openness to experience’ in the Big Five Model)
  - curiosity, tolerance, creativity;
- *task performance* (corresponding to ‘conscientiousness’ in the Big Five Model)
  - achievement motivation, responsibility, self-control, persistence;
- *emotional regulation* (corresponding to ‘emotional stability in the Big Five Model’)
  - stress resistance, optimism, emotional control;
- *engaging with others* (corresponding to ‘extraversion’ in the Big Five Model)
  - sociability, assertiveness, energy;
- *collaboration* (corresponding to ‘agreeableness’ in the Big Five Model):
  - empathy, trust, cooperation;
- *compound skills*
  - critical thinking, metacognition, self-efficacy.

Muraro et al. (2018) pointed that social and emotional skills differ from personality traits in that they are context-dependent, include knowledge and attitudes, and can be behaviourally based<sup>8</sup>.

## Discussion and conclusions

As we have shown in previous sections, non-cognitive skills could refer to a collection of skills, traits, behaviours, mindsets, and attitudes often labelled using different terms: social and emotional skills, soft skills, 21<sup>st</sup> Century skills, among others. It has been already observed by Camfield (2015) that a stable definition of what non-cognitive skills are has not been settled. Also, Petway and colleagues (2016) pointed out that the use of the term non-cognitive skills is a source of controversy, because some authors consider the term inappropriate since cognitive processes underlie thoughts and behaviours.

Moreover, we have seen that the distinction between non-cognitive skills and related concepts and personality is important. Personality is defined as the organization within the individual of the psychobiological systems by which a person shapes and adapts to ever-changing internal and external influences (Cloninger & Cloninger, 2011, p. 25). This is why it is considered ‘relatively malleable’ according to the widely accepted Big Five model. Personality traits are different from skills, that are ‘behavioural components’ that can be trained and are distinguished, only for study reasons, into:

- cognitive skills (low-order and high-order cognitive skills);
- non-cognitive skills (that are “facets” of personality and influence socio-emotional skills as reactions).

Usually cognitive and non-cognitive skills interact together, and it is difficult to distinguish them during an action. For example, one might debate if skills like ‘critical thinking’ or ‘problem solving’ might be considered emotional skills or, on the other hand, pure cognitive skills.

Another key issue observed in our study was the relationship between skills and competences. In some frameworks, both terms are used as synonyms or even in a reverse order, with competence subordinated to skills. For example, in American English ‘competence’ indicates the ability to do something well or effectively, so that it is more a ‘quality’ of the action rather than a specific construct.

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<sup>8</sup> It is interesting here to note that Muraro defined skills, similarly to the definition of competence as we saw in the introduction to this paper. As observed before, sometimes the difference among skills and competences is blurred.

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Nevertheless, as the majority of studies and frameworks recognise, competence is a wider construct including knowledge, attitudes and skills. As Rychen & Salganik (2003, p.3) highlight, ‘competent performance or effective action implies the mobilization of knowledge, cognitive and practical skills, as well as social behaviour components such as attitudes, emotions, and values and motivations.’ The concept of competence is also forged by the culture, the human and social capital of a person (Büchner et al., 2012). As stated in some studies (for example McGuinness, 2018) we need to consider cultural, social, economic, ethical and civic dimensions in the definition of non-cognitive skills<sup>9</sup>.

In order to obtain a conclusion on the myriad of terminologies analysed in relation to non-cognitive skills, we may stress that the study of terminologies on non-cognitive skills is not only connected with education and employability, that it is to **base it on an economic discourse** following the terminology of the framework created by the UNESCO study on transversal skills in the Asia-Pacific Region (UNESCO, 2015). As pointed out by Cinque (2016) and following UNESCO Framework, the economic discourse appears as the most powerful driver to integrate non-cognitive skills in the university curriculum, both in a **global and national perspective**, i.e. to boost economic development and increase international competitiveness, but also to improve employability of young people (**personal perspective**). At the same time, some researchers (for example Barrett, 2016) also emphasise both the **social and humanity discourses** in which education is seen as a vehicle for fostering a number of social, ethical, and moral attributes among students, such as national identity, respect for diversity, tolerance, and empathy. Research makes it clear that all countries and economies seek the integration of transversal competencies as imperative to the holistic development of their youth, and consequently their societies. All reports mention changing global and social contexts as important factors driving the promotion of non-cognitive skills / transversal competencies as these are seen as integral to fostering the attitudes and inter-personal attributes necessary to manage and cope with, for example, uncertainty and changes.

In order to conclude, we can say<sup>10</sup> that the study of the terminology on non-cognitive skills may intersect **the economic, the social and the humanity discourses together with different global, national and personal perspectives**. Sometimes the drivers for the integration of non-cognitive skills into education are built upon a combination of these discourses and perspectives.

Table 5. Rationale for Integration of Transversal Competencies into Education

	Economic Discourse	Social Discourse	Humanity Discourse
Global Perspective	Competitiveness	Social Progress	Global Citizenship
National Perspective	GDP* Growth	HDI** Growth	National identity
Personal Perspective	Employability	Community	‘Holistic’ formation

Source: adapted from Unesco, 2015

\* GDP: Gross domestic Product - \*\* HDI: Human Development Index

<sup>9</sup> Concretely, in the recent literature on non-cognitive skills, there is a tendency to focus on the concept of context and on the interplay between the environmental factor and the development of skills. Meanwhile, other studies on non-cognitive skills focus on the role of cultural and social capital (Büchner et al., 2012; Abbott & Reilly, 2019). Other research covers fields previously not included such as cultural contexts or preferences for social roles (Grove et al. 2011, Lundberg, 2017), cultural norms and women’s human capital in developing countries (Chua, 2017), or the value of social skills in promoting the employability of individuals with disabilities (Agran et al. 2016).

<sup>10</sup> The original framework consisted of the same categories but used, sometimes, different terms.

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A sound taxonomy should also consider the goals of the 2020 European Skills Agenda<sup>11</sup>, that pursues a real paradigm shift in skills to take advantage of the green and digital transitions and support a prompt recovery from the COVID-19 crisis, by:

- strengthening **sustainable competitiveness**, to implement the European Green Deal and putting its digital and industrial strategies into practice;
- ensuring **social fairness**, putting into practice the first principle of the European Pillar of Social Rights: access to education, training and lifelong learning for everybody, everywhere in the EU;
- building up **resilience** to react to crises, based on the lessons learnt during the COVID-19 pandemic.

This is why we may propose a **third dimension to be added to the existing UNESCO framework (2015)**, which is the ‘**drive**’, i.e. the vision of the ‘bigger picture’ underlining the way we interpret the different discourses on competences and skills. The third dimension includes three components: labour market (for sustainable competitiveness), education policies (as far as social fairness is concerned) and personal development (resilience).

In table 6, we put together the three dimensions, each divided into three sub-dimensions.

*Table 6. Rationale for a sound taxonomy of non-cognitive skills*

Perspective	<ul style="list-style-type: none"><li>• Global</li><li>• National</li><li>• Personal</li></ul>
Discourse	<ul style="list-style-type: none"><li>• Economic</li><li>• Social</li><li>• Humanity</li></ul>
Drive	<ul style="list-style-type: none"><li>• Labour Market</li><li>• Education Policies</li><li>• Personal Development</li></ul>

Source: Own elaboration, based on UNESCO Framework (2015)

Taking the example of the well-known Bray & Thomas’ Cube (1995), used for comparative analysis in education, we can imagine the different frameworks and classification of skills as ‘embedded’ in a cube with the three dimensions: perspective, discourse and drive. In this sense, we might get a more dynamic vision of the taxonomy, so that the terminology is ‘placed’ in a specific perspective, considering one of the different discourses and a particular drive.

For example, the Step Survey of the WorldBank has a global perspective, concerns mainly the economic discourse and is driven by the labour market needs. On the other hand, the JRC Lifecomp framework has a European (national) perspective, is based on a social discourse and is driven by education policies. Some of the SEL frameworks presented by Harvard have a personal perspective, are based on the humanity discourse (holistic formation) and on a personal development drive.

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<sup>11</sup> <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>

Considering the three dimensions we can map the different frameworks and the terms of each framework on a continuum that might explain the different uses in the various fields and put order in the terminology in a **descriptive** and **non-prescriptive** way.

This vision highlights that there are tensions and polarities among different visions of competences and skills, sometimes focusing on ‘**potential**’ versus ‘**development**’, on ‘**habits**’ versus ‘**performance**’, on ‘**individual**’ versus ‘**social/organisational**’ perspectives. As a matter of fact, the different terms can’t be used as synonyms. The economic literature clarifies psychological studies by establishing that psychological attributes are measured by performance on tasks. Heckman and Kautz (2012) highlighted the relationship between the Big Five personality traits and their ‘facets’ as non-cognitive skills, i.e. their visible aspects that can be measured and assessed. Nevertheless, inferring skills from performance on tasks requires standardizing all the other contributing factors that produce the observed performance. Furthermore, although some studies draw a conceptual distinction between **non-cognitive skills** and **cognitive skills**, it is not possible to disentangle these concepts fully. All non-cognitive skills involve cognition, and some portion of performance on cognitive tasks is made possible by non-cognitive skills. Usually cognitive and non-cognitive skills interact together, and it is difficult to distinguish them during an action.



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