SCUOLA DI DOTTORATO

UNIVERSITÀ DEGLI STUDI DI MILANO-BICOCCA

Department of Psychology

Ph.D. Program in Psychology, Linguistics, and Cognitive Neuroscience (Cycle XXX)

Curriculum in Social, Cognitive, and Clinical Psychology

Intellectual Giftedness in Adulthood. A Multimethod Assessment Approach

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ACADEMIC YEAR 2016/2017

To my *desire*.
I have chased *you*.
Yet, *you* were never to be caught.
You have been leading me all this time.

Contents

Abstract

Giftedness has been extensively examined in children and adolescents, whereas few papers have been published on the same group in adulthood. As suggested by the National Association for Gifted Children (2010), giftedness refers to "outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence (documented performance or achievement in top 10% or rarer) in one or more domains (such as intellectual, creative, artistic, leadership, or academic)". This dissertation has examined the gifted group composed of individuals with high intellectual aptitude (i.e. intelligence test scores equal to or greater than 130) rather than who have obtained concrete life achievements.

Over the last century, high intelligence has been often considered a "winning card" because strong relationships have been found with better physical health, psychological adjustment, and more prestigious job position. Recently, this position has been challenged because empirical evidence has shown that people with extraordinary intellectual abilities reported higher levels of affective dysregulation, attentional and hyperactivity deficit, autism spectrum disorders, and immune disorders.

The present dissertation aims to approach these issues, exploring cognitive, personality, and emotional functioning of intellectually gifted individuals in adulthood, applying the principles of the Multimethod Assessment Approach.

In the *Chapter 1*, I have defined intellectual giftedness according to the CHC model. Then, I have examined the cognitive profile of gifted adults; the pattern of their performance (i.e. what is the best indicator of superior intelligence?); and scores variability across different domains.

In the *Chapter 2*, I have examined personality traits and emotional regulation of gifted individuals according to developmental psychology and psychopathology theories. I have considered an updated version of the disharmony hypothesis in order to describe how vulnerabilities and developmental maladjustments may result from inadequate responses of the environment (e.g., friends, teachers, parents, society) to gifted individuals' unique needs.

In the *Chapter 3*, I have examined emotional intelligence (EI), both as a set of intellectual abilities and of personality traits. I have conducted an exploratory study to test whether gifted adults showed similar results to those obtained by gifted students, and the investment model of EI which describes the relationships between crystallized and emotional intelligence.

In conclusion, I have combined results from the three chapters according to multiple lenses analysis (Lilienfeld, 2017) and I have described similarities and differences of this group in genetic, psychological, and sociocultural aspects compared to the general population.

Introduction

How different does it feel to be a genius? How do these people think and feel? Most of the literature has focused on the unique psychological experience of gifted children, whereas few studies have examined what happens when gifted individuals enroll in college, are involved in long-term relationships or get a job (Rinn & Bishop, 2015). Indeed, "it's not as though these former children slough off their giftedness like discarded skin at the age of sixteen or eighteen or twenty-one. Gifted children do grow up, and they become gifted adults" (Jacobsen, 1999, p. 9). Psychologists and educators need to know whether intellectual potential translates into concrete life advantages (Subotnik, Olszewski-Kubilius, & Worrell, 2011) or it may constitute an obstacle to psychological and social adjustment. More knowledge on gifted adults could help practitioners to be more sensitive and understand how high intellectual abilities may affect emotions and personality traits.

Over the past century, empirical studies and meta-analytic reviews have supported the idea that high Intelligence Quotient (IQ) is related with desirable and positive psychological outcomes (Francis, Hawes, & Abbott, 2016; Martin, Burns, & Schonlau, 2010; Terman & Oden, 1959). For instance, high cognitive abilities correlated with educational level and socioeconomic status (Bergman, Corovic, Ferrer-Wreder, & Modig, 2014; Gottfredson, 2004; Nyborg & Jensen, 2001) and were positive indicators of high system integrity (i.e., well-functioning body and more efficient to face environmental challenges) (Gale, Batty, Tynelius, Deary, & Rasmussen, 2010; D. Lubinski & Humphreys, 1992; Starr et al., 2004; Walker, McConville, Hunter, Deary, & Whalley, 2002; Wraw, Deary, Gale, & Der, 2015; Zettergren & Bergman, 2014). However, when gifted individuals were compared to average-intelligence people, results were controversial. Karpinski, Kinase Kolb, Tetreault, and Borowski (2017) have published a paper on how high IQ may represent a potential risk factor for the development of affective dysregulation, attentional and hyperactivity deficit, autism spectrum disorders, and for increasing the incidence of immune disorders in "Intelligence". Similar evidence was found examining associations between gifted and diagnosis of depression (Jackson & Peterson, 2003; Wraw et al., 2015); social isolation (Cross, Speirs Neumeister, & Cassady, 2007); bipolar disorder (Higier et al., 2014; MacCabe et al., 2010); mania (Koenen et al., 2009); anxiety disorders (Lancon et al., 2015); asthma and other allergies (Benbow, 1986); myopia (Verma & Verma, 2015); negative leader behaviors (Antonakis, House, & Simonton, 2017).

Theoretical and methodological limitations often affect the validity of gifted studies.

1. Gifted children are assumed to preserve their superior intellectual abilities in adulthood. Samples of gifted adults often consist of individuals who were administered intelligence or achievement tests in childhood. Although this sampling method makes easier collecting a large amount of data, it may be methodologically questionable. I will give an example to let the reader get this through. Let us pretend I want to examine work-related stress in people with anxiety disorders. Applying the same methodology commonly used in gifted studies, my sample would consist of people who had shown higher level of anxiety in childhood. Of course, they have been at risk to develop a relevant clinical disorder but it would make more sense assessing their current level of anxiety[1]. In the same way, children who had obtained

[1] This is an over-simplification because the conception of giftedness has been largely debated (Sternberg & Davidson, 2005), and so has the definition of intelligence in adulthood (Ackerman, 2017). Thus, using intelligence test scores to select gifted individuals does not solve this issue completely and leads to other kinds of limitations. I will examine these implications through my whole dissertation.

superior scores in intelligence tests are more likely to be gifted in adulthood. However, many variables may interfere with this process. Thus, administering intelligence tests to adults may improve the validity of those studies.

2. Inclusion criteria for gifted samples have often been based on superior scholastic achievements (e.g., especially in STEM subjects) or extraordinary verbal abilities. Unfortunately, this selection strategy may over-represent gifted children, and later adults, who were highly functional and ignore gifted students whose intellectual abilities were masked by other factors, such as environmental obstacles (e.g., low socioeconomic status, stereotypes, or cultural differences); physical or learning disabilities; or motivational issues or emotional maladjustments (National Association for Gifted Children, 2010).

3. Empirical results often diverge from one another and they are not typically grounded on well-known psychological framework. Since giftedness has been extensively examined in students, it has often interpreted within psychoeducational theories. Thus, psychological assessment has been employed to identify students with extraordinary intellectual abilities in order to improve their scholastic achievements and relationships with family and peers. However, giftedness is rarely considered in clinical practice, especially in adulthood. For instance, there are four references to the gifted population in the entire DSM-5 (APA, 2013): two of them refer to twice-exceptional students and the other two are cited in the description of disorders which may be related to increasing individual self-esteem (i.e, narcissism and attenuated psychosis). By contrast, intellectual disability (i.e., placed on the opposite extreme of the intelligence curve) constitutes exclusion criteria for most of the disorders in the manual. Also, giftedness is rarely considered in psychopathological models; despite empirical evidence, intelligence is often overlooked when psychological functioning is examined.

Based on these preliminary considerations, the cuurent doctoral dissertation has examined cognitive, personality traits, and emotional functioning of intellectually gifted individuals in adulthood. As suggested by NAGC (2010), these individuals have been identified emphasizing intellectual aptitude and potential rather than concrete life achievements.

Gagne's Differentiated Model of Giftedness and Talent (DMGT) (2000, 2005) provides a consistent theoretical framework for this perspective. He differentiated between "gifts" as natural abilities (e.g., intellectual, creative socio-affective, or sensorimotor) and "talents" as the development of these gifts into productive and rewarding skills. He underlined that gifts and talents are domain-specific (i.e., extremely high-ability in one restricted area). The transformation into practical skills depends on individual developmental catalytic experiences, both intrapersonal and environmental. Intrapersonal catalysts refer to physical features, personality traits, motivation and dedication, which may protect from psychological maladjustments, boredom, and failures. By contrast, environmental catalysts involve interaction with multilevel environments, significant interpersonal relationships and life events, and specific programs developed to promote talents. Finally, Gagné recognizes the role of chance in promoting the development of talent.

The methodology of the current dissertation was based on Multimethod Clinical Assessment (Hopwood & Bornstein, 2014); many psychological measures were administered to unravel the complex set of abilities and traits that contribute to gifted individuals' "experiences, core beliefs, emotional patterns, motives, traits, defenses, and coping strategies" (p. 2). Indeed, the fundamental aim of clinical assessment is to collect pieces of information from multiple tests (e.g., personality

inventory and intelligence tests), and reading these data in light of theoretical models (e.g., CHC Theory of Intelligence, Developmental Psychology and Psychopathology, Theory of Mind, etc.), psychological history, information referred by significant others, and qualitative observations in order to provide a comprehensive understanding based on test score convergences *and* divergences. When tests measure similar psychological processes with different formats and operationalization, analysis of score divergences may provide insights about multiple levels of psychological functioning which are not necessarily contradictory. Using different sources gives significant and additional information which may not be obtained from one single test.

The main goal of this dissertation has been to study an overlooked population examining several psychological domains in order to integrate their results within the context of intelligence and personality theoretical framework. In the *Chapter 1*, I have defined the concept of intellectual giftedness based on the CHC model (Schneider & McGrew, 2018). Then, I have examined the cognitive profile of gifted adults; their pattern of performance (i.e. what ability is the best indicator of superior intelligence?); and scores variability across intellectual domains. In the *Chapter 2*, I have focused on gifted individuals' vulnerabilities in personality traits and emotional dysregulation in light of developmental psychology and psychopathology theory (Cicchetti, 2016). I have adopted an updated version of the disharmony hypothesis (Preckel, Baudson, Krolak-Schwerdt, & Glock, 2015) which suggests that inappropriate responses from the social context (e.g., friends, teachers, parents, society), rather than giftedness *per se*, increase the likelihood of developmental maladjustments, which in turn may constitute a risk factor to develop psychological vulnerabilities. In the *Chapter 3*, I have examined the relatively new construct of emotional intelligence (EI), both as an intellectual ability and a set of personality traits. I have conducted an exploratory study to evaluate whether preliminary results obtained by gifted students (Zeidner, Shani-Zinovich, Matthews, & Roberts, 2005) may be applied to gifted adults and to test the investment model of EI which describes the relationships between verbal abilities and emotional intelligence. Finally, I have integrated data from the three chapters in a brief conclusion according to the multimethod assessment approach (Hopwood & Bornstein, 2014) and the multiple lenses analysis (Lilienfeld, 2017).

My hope is that this dissertation may help clinicians to think of intellectual giftedness as an important psychological feature in the clinical assessment, and gifted people to be aware about the reason why they may have felt "out-of-sync" and different from their peers since they were very little.

CHAPTER 1: COGNITIVE PROFILE OF INTELLECTUALLY GIFTED ADULTS

1.1 Intelligence and Cognitive Assessment

"Intelligence assessment" and "cognitive assessment" have been defined as different processes for a long time (Sparrow & Davis, 2000). Traditionally, "intelligence assessment" has been associated with measuring one's Intelligence Quotient (IQ), which has been the most well-known indicator of the *g* factor. William Stern (1912) was the first author to suggest the IQ score as a measure of intelligence. Since then, theoretical and empirical works have been done, improving the conception of intelligence and developing reliable models and clinical tools. Indeed, IQ scores have been related to a large number of long-term life outcomes (Schmidt & Hunter, 1998; Warne, 2016). Whereas some scholars and psychologists still repute IQ score as the best indicator of intelligence (Jensen, 1980), others prefer to emphasize strengths and weaknesses in one's profile (Flanagan, Ortiz, Alfonso, Kaufman, & Kaufman, 2013; Neisser et al., 1996; Schneider & McGrew, 2018). For them, the construct of IQ as global index of intellectual functioning is outdated and it may lead to a limited view of intelligence (McIntosh, Dixon, & Pierson, 2012; Ramos-Ford & Gardner, 1997). Although the IQ measurement may be still relevant, it should be combined with scores associated to narrower domains. On the other hand, scholars refer to "cognitive assessment" when the emphasis changes from the description of one single score to how people's cognitive abilities work together and produce individual outcomes during the test administration *and* in real life. This approach aims to study how people can use their intellectual abilities to process mental information, learn and acquire more knowledge or solve novel problems based on what they already know (Hunt, 2011; Mackintosh, 2011); particular emphasis is given to low-level intellectual skills, such as processing speed, working memory and associative learning. According to this conception, results of the cognitive assessment can also benefit from neuropsychological empirical literature. Indeed, intelligence is conceptualized as a system composed of multiple abilities organized in complex and causally related networks.

Despite I recognize that it is important to be aware of historical differences between "intelligence assessment" and "cognitive assessment", these terms can be considered as sides of the same process with different emphasis, interpreting intelligence respectively as a global and multi composite entity. Thus, the two terms will be used interchangeably in this dissertation.

Many different theories of "intelligence" have been proposed during the last century; each theory defines the construct and provides a description of multiple sub-components. Moreover, scholars have created measures for the assessment and collected empirical data about relationships between them and life outcomes. In 1997, Linda Gottfredson proposed a general definition of intelligence and summarized the most important results about the relationships between intellectual abilities and scholastic achievements, sociodemographic factors, work attainment, and other variables. She defined intelligence as the "general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. […] It is a broader and deeper capability for comprehending our surroundings" (p. 13). Although many scholars may agree with Gottfredson's definition, it is not detailed enough to be operationalized in empirical studies.

In the next paragraphs, I will review the most important models of human intelligence in psychology and cognitive science. Then, I will run through the definition of intellectual giftedness

and empirical studies on cognitive characteristics of gifted individuals, both in childhood and in adulthood. I must point out that I will not consider classic theories of intelligence, such as Spearman's (1904) *g* factor Model or Thurstone's (1938) Primary Mental Abilities Model, and their fundamental contributions will be discussed in relation to the development of current models.

1.1.1 Different models for Intelligence Assessment[2]

CHC Theory of Intelligence (Schneider & McGrew, 2018). The Cattell-Horn-Carroll model is the combination of the Cattell-Horn model (1966; Horn & Noll, 1997) and Carroll's (1993) theory. It is based on psychometric intelligence research conducted over the last century (Reynolds, Keith, Flanagan, & Alfonso, 2013); it defines both the main (broad abilities) and the less (narrow abilities) important factors of individual differences measured by intelligence tests. The validity of CHC model has been proved through numerous confirmatory factor analysis (Jewsbury, Bowden, & Duff, 2017). In particular, intelligence is structured hierarchically on three *strata*. The *g* factor (or general intelligence) lies at the top of the hierarchy (third stratum); the second stratum is composed of 15+[3] broad abilities (e.g., verbal ability, fluid reasoning, visual-spatial processing, processing speed, short-term memory, etc.) which are defined as groups of narrow abilities causally related (Schneider, Mayer, & Newman, 2016); finally, the bottom of the model (first stratum) is composed of specific mental abilities (about 70), connected with one single broad ability. Expertise and education can improve these specific skills (e.g., such as visual memory, verbal knowledge, and perceptual speed) (McGrew, 2009). Thus, the CHC model considers intelligence both as a single (i.e., general intelligence or *g* factor) and multi-composite entity. Moreover, broad abilities can be grouped into subclasses, such as perceptual systems (auditory or visual processing), controlled attention (working memory and fluid reasoning), speed, motor abilities or specific knowledge (Schneider & Newman, 2015).

Recently, CHC Theory of Intelligence has become the most influent model to develop and update intelligence tests (e.g., Stanford-Binet 5, Roid, 2003; Kaufman Assessment Battery for Children – II, A.S. Kaufman & N.L. Kaufman, 2004; Woodcock-Johnson-IV, LaForte, McGrew, & Schrank, 2014; Wechsler Intelligence Scale for Children – V, Wechsler, 2014). The factorial structure of intelligence tests provides empirical evidence of the validity of CHC model (Jewsbury et al., 2017; Strauss & Smith, 2009).

PASS Model (Luria, 1966, 1970). The PASS Model is based on the interaction of four basic neuropsychological processes (i.e., Planning, Attention, Simultaneous, and Successive). Human cognition is composed of three hierarchically functional units (or *blocks*), which are located in specific brain areas. According to Naglieri (2011), units are "foundational, neuropsychologically identified ability that provides the means by which an individual function in this world" (p. 147). The arousal and attention system (first unit) is located in the brain-stem, in the diencephalon, and in

[2] "Assessment" and "testing" refers to distinct processes. Psychological testing consists of administering one test in order to obtain a specific score, which is interpreted based on normative data from the general population. Based on this process, practitioners can provide a mere description of the scores. Differently, psychological assessment involves the administration of a variety of tests, generally according to multimethod assessment principles, and considers one's scores in the context of personal history, referral information, and non-test factors in order to understand one's overall functioning and then communicate diagnostic hypotheses to the client, and/or significant others (Meyer et al., 2001).
[3] The number of the broad abilities in the CHC Model is constantly updated, based on new empirical studies or theoretical insights. For instance, whereas Long-Term Memory (*Glr*) was conceptualized as a single broad ability in CHC v1.0 (McGrew, 1997), currently it is not present in model; indeed, two different abilities were identified as components of *Glr*, i.e., Retrieval Fluency (*Gr*) and Learning Efficiency (*Gl*). A detailed presentation about the evolution of the concept of Long-Term Memory within the CHC Model can be retrieved at: http://www.iapsych.com/glgr062116.pdf

the medial regions; this unit provides the appropriate level of activation and selective attention (i.e., ability to select one stimulus among many others). Information coding (second unit) is located in occipital, temporal, and parietal areas of the brain. It involves two processes (i.e., simultaneous and successive), which allow receiving, process, and hold information from the environment. The Simultaneous process is responsible for integrating stimuli in clusters and understanding relationships among different components of objects (e.g., recall the position of stimuli in a grid). The Successive process provides serial analysis of stimuli, integrating them in chain progressions (e.g., recall a sequence of numbers). Finally, strategic planning and control of cognitive outcomes (third unit) are located in the frontal lobes. This unit involves the most complex human behaviors (i.e., programming and verification), personality, and consciousness (Das, 1980; Naglieri, Das, & Goldstein, 2014).

Moreover, personal knowledge and individual skills play an important role in the PASS Model and they are related to each basic process. Indeed, experiences, education, motivations, and emotions represent the background on which information is processed by attention, coding, and planning process. Thus, sensorial systems receive information from outside, which is analyzed through one or more neuropsychological processes, using previous knowledge, memories, and thoughts. The four processes can only work within the individual context of knowledge and they can also influence and direct learning of new competences or acquisition of new information. The fundamental contribution of the PASS Model has been to shift the focus of intelligence tests from the *content* of the ability (verbal vs. nonverbal) to the *process* that people employ to solve tasks (sequential vs. simultaneous).

PASS cognitive processes can be assessed through recent intelligence tests, such as the Kaufman Assessment Battery for Children – II (KABC–II), A.S. Kaufman & N.L. Kaufman, 2004; and the Cognitive Assessment System2 (CAS2), Naglieri et al., 2014.

Triarchic Theory of Successful Intelligence (Sternberg, 2011). Sternberg's Theory describes four components of intelligence. The first key component to achieve successfully in life is a balance among analytical, creative, and practical intelligence; analytical ability (or *componential intelligence*) allows to solve tasks and judge the efficacy of strategies to reach goals; creative ability (or *experiential intelligence*) allows to articulate problematic situations and find new solutions; practical ability (or *contextual intelligence*) is required to act based on personal ideas and persuade other people to accept them. A second key component refers to the ability to attain personal achievements, not necessarily in school. A third component is the ability to recognize that individual achievements depend on one's strengths and weaknesses. The fourth component refers to the balance of abilities through different processes in relation to the external environment, such as adaptation, shaping, and selection; respectively, these three skills allow to accommodate individual characteristics to fit with the environment, change the environment in order to fit with oneself, and look for new environments that improve the likelihood to achieve goals consistent with one's wishes, abilities, and moral standards.

Sternberg and colleagues (1999) examined the validity of Triarchic Theory and studied how this conception of intelligence can increase students' scholastic achievements. They suggested that scholastic performances would improve when instructions were matched to students' interests and abilities. Although teaching methods were specifically designed to increase all kinds of abilities (i.e., analytic, creative, and practical), scholastic achievements improved only for some students, regardless their ability pattern (Sternberg et al., 2014). The Rainbow Project examined the validity of the assessment (Sternberg, 2010). Students were administered the SAT (i.e., Scholastic Aptitude

Test) and additional tasks, such as measures of analytical, creative, and practical abilities. Results showed that these additional tasks predicted better college GPA (i.e., Grade Point Average) rather than the only SAT score. Moreover, the use of these tests decreased considerably differences in results among people of different ethnicities. However, intelligence tests built on Sternberg's theory are not usually used in clinical practice.

Emotional Intelligence (Mayer, Caruso, & Salovey, 2016). Over the last 30 years, some authors have distinguished between "cool" and "hot intelligence" (Schneider et al., 2016). "Cool intelligence" refers to traditional intellectual abilities (such as crystallized knowledge, fluid reasoning, short-term memory, processing speed, etc.) and "hot intelligence" refers to personal (PI), social (SI), and emotional intelligence (EI). Mayer, Salovey, and Caruso (2002) have developed the main model of EI, that is composed of four factors (or *branches*): (a) the perception and expression of self and others' emotions (Perceiving Emotion); (b) the integration of thoughts and emotions (Facilitating Thought); (c) the understanding of emotions and how they can change (Understanding Emotion); (d) the management of emotions in order to attain definite goals (Managing Emotions). The MSCEIT is a performance-based test to evaluate these four abilities through eight subtests (Mayer et al., 2002). MacCann and colleagues (2014) have confirmed that emotional intelligence can be conceptualized as a broad ability in the CHC model (i.e., *Ge*), confirming three out of four abilities (i.e., Perception, Understanding, and Management) postulated by Mayer and colleagues.

Other EI models are so-called "mixed" because of a different conceptualization of the construct (e.g., EQ-i, Bar-On, 1997; Trait EI, Petrides, 2009). These models describe EI as a set of personality traits and the label "mixed" refers to individual differences in experiences and behaviors, involving "motivations, interpersonal and intrapersonal abilities, empathy, personality factors and well-being" (Gutiérrez-Cobo, Cabello, & Fernández-Berrocal, 2017, p. 2).

I will extensively examine the topic of Emotional Intelligence in the third chapter of this dissertation.

1.1.2 Intelligence Tests: from Intelligence Quotient to Cognitive Abilities

Intelligence is assessed through performance-based tests, which reflect specific theoretical backgrounds. Each test or battery measures one or more intellectual abilities, comparing one's results to the scores obtained from a representative sample of the overall population. In general, intelligence tests require to solve a problem (i.e., verbal or nonverbal) or to execute tasks with observable performances (e.g., copying symbols as quickly as possible). Since the beginning of the last century, it has been clear that mental abilities cannot be seen, heard or measured directly (Freeman, 1926). Thus, tests measure intelligence *indirectly*; intelligence tests allow to measure individual differences in latent traits, triggering behavioral outcomes (Gottfredson & Saklofske, 2009). The extension of the ability can be computed from different markers (e.g., quality of test taker's answer, the sum of correct items, or time to solve a task).

Alfred Binet is considered the creator of the first intelligence screening test in the history (Wasserman, 2012). He happened to be part of the commission of the French Minister of Public Instruction while France was extending universal education to all children of the country at the beginning of the 19th century. The aim of the commission was to identify children with mental retardation (e.g., blind, deaf-mute, and backward) in order to provide special education for them. In creating this test, Binet and Henri's (1895) aim was to avoid the measurement of simple mental processes, like Galton (1885, 1891) or McKeen Cattell (1886) had done. By contrast, they suggested that superior processes were more indicative of one's overall intelligence than mental

tests which were designed to measure sensory and motor abilities. Indeed, the study of individual differences can be informative if tests discriminate well among people from the general population. Otherwise, even though mental tests are more precise, differences in simple tests are quite small and it is very hard to link their results with life outcomes. Their work was published in 1905 and the test consisted of 30 items which allowed to estimate global intelligence (i.e., Mental Level), collocating a child on a scale from *Idiots* to *Very Superior*. Mental Level (ML) was calculated as a ratio of mental age to chronological age. The concept of IQ was proposed by Lewis Terman (1916), according to Stern's proposal of "mental quotient". Terman translated and adapted the American edition of the Binet-Simon Intelligence Test (later called the Standford-Binet Intelligence Scale because of the name of the university where he worked as a professor). He published a doctoral dissertation on high abilities students and for this reason he has been also considered the founder of "gifted studies". He also introduced the concept of standardization sample in order to compare one's results to the general population. However, representativeness of his test was affected by the composition of the sample (i.e., white, urban, and middle-class people). Although Terman did not support Spearman's *g* factor model, his IQ score can be considered the first functional estimate of general intelligence and it reinforced the view of intellectual abilities as a unitary construct (Terman, 1916). Over the following years, Terman created new achievement tests in order to identify gifted students and provide special education and accelerated curricula.

Intelligence assessment has been largely influenced by David Wechsler (1896-1981). The new editions of his tests (i.e., WAIS-IV, and WISC-V) are still the most popular tests to evaluate intellective abilities and global intelligence (Camara, Nathan, & Puente, 2000; Cody & Prieto, 2000; Wasserman, 2012). Based on his experiences as an Army examiner during the World War I, he realized that results of contemporary intelligence tests (mainly, the Stanford-Binet Intelligence Scale) tended to underestimate people's intellectual level because of linguistic demands. For this reason, he created the Wechsler-Bellevue Intelligence Scale (WBIS) to measure IQ and to provide specific scores for verbal and nonverbal abilities. He defined intelligence as "the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment. It is global because it characterizes the individual's behavior as a whole; it is an aggregate because it is composed of elements or abilities which, though not entirely independent, are qualitatively differentiable. [However,] intelligence is not identical with the mere sum of these abilities" (Wechsler, 1939, p. 3). Wechsler's definition of intelligence is interesting because he was the first author to define the construct both as unitary and multi-composite at the same time. After the creation of the WBIS Forms I (Wechsler, 1939) and II (Wechsler, 1946), these scales had been revised several times, differentiating between children and adults' tests (Wechsler Intelligence Scale for Children (WISC), Wechsler, 1949; Wechsler Adult Intelligence Scale (WAIS), Wechsler, 1955; WISC-R, Wechsler, 1974; WAIS-R, Wechsler, 1981). Both scales had a similar structure and were designed to assess IQ, VIQ (Verbal Intelligence Quotient), and PIQ (Performance Intelligence Quotient). After Wechsler passed away, the third and the fourth edition of the Wechsler scales were published (WISC-III, Wechsler, 1991; WAIS-III, Wechsler, 1997; WISC-IV, Wechsler, 2003; WAIS-IV, Wechsler, 2008). The structure of the test has been updated in line with the empirical literature, increasing the number of broad factors that the scale allowed to measure (i.e., working memory and processing speed) and improving the reliability of the abilities already present in the Wechsler scales (i.e., verbal ability and visuo-perceptual reasoning). In the last edition of the WISC (WISC-V, Wechsler, 2014), Psychological Corporation has applied further improvements, implementing different tasks to measure fluid reasoning (*Gf*) and visual processing (*Gv*), and fluency retrieval (*Gr*).

Two main pathways have marked the history of intelligence tests:

a. Identification of broad factors which reflect specific components of intelligence. The measurement of the IQ has been the final goal of many scholars and clinicians for a long time (Jensen, 1998; Spearman, 1904) since intelligence tests were initially created to identify the so-called "feebleminded", and to weed out the unfit (A.S. Kaufman, 2009, p. 25). More recently, confirmatory factorial analyses (Carroll, 1993; Taub & McGrew, 2004), neuroimaging evidence (Duncan et al., 2000) and neuropsychological selective impairments (Duncan, Burgess, & Emslie, 1995) have confirmed that intelligence is better explained as a multicomponent entity. Each ability refers to a cluster of intellectual skills which allow solving a set of tasks both during the administration of the test and during everyday life. Moreover, these abilities may have specific relationships with one another. Indeed, information processing models (e.g., Cattell, 1963; Dean & Woodcock, 1999) organize these abilities in order to understand how the information is "apprehended, encoded, stored, organized, retrieved, and mentally manipulated to enable a person to perform cognitive tasks" (Floyd & Kranzler, 2012, p. 498). IQ can be a good indicator of overall functioning but it cannot be the goal of cognitive assessment. For instance, Fiorello and Primerano (2005) reviewed the literature on the relationships between CHC broad abilities and scholastic achievements, showing that measures of specific intellectual domains are better predictors of scholastic achievements than global intelligence scores.

b. Definition of a theoretical framework based on empirical evidence to update and interpret intelligence test scores. As I recalled in the previous paragraph, several theories of intelligence have been suggested; cognitive abilities or processes are organized into different structures and measured by specific tasks. The CHC Theory of Intelligence (Schneider & McGrew, 2018) is the most widespread and reliable taxonomy of human cognitive abilities. It is based on Cattell's and Carroll's psychometric analyses and theories (McGrew, 2009). Contrary to the other theories, the CHC model has been explicitly proposed as a theory subjected to constant upgrades (Schneider & McGrew, 2018). Moreover, this model aims to explain individual differences in life outcomes, operationalizing each ability from constructs to measurements, and to the world.

1.1.3 CHC Theory of Intelligence and Relationships with Life Outcomes

There is a large literature on the correlations between IQ scores and long-term life outcomes (Deary, Whiteman, Starr, Whalley, & Fox, 2004; Gottfredson, 1997; Wai, Lubinski, & Benbow, 2005; Warne, 2016). Scholars have found positive relationships between children's global intelligence score and many positive life outcomes, such as life expectancy (Deary et al., 2004), socioeconomic status in adulthood (Jensen, 1998), and creativity production (Kuncel, Hezlett, & Ones, 2004). Moreover, intellectual abilities show also inverse correlations with negative life outcomes, such as psychopathological disease (Walker et al., 2002), imprisonment (Gottfredson, 1997), death from cardiovascular issues (Deary et al., 2004), or being victim of a car accident (O'Toole & Stankov, 1992). Intelligence is the only single construct that can "predict important social outcomes such as educational and occupational levels far better than any other trait, and it is a key factor in cognitive aging" (Plomin, 2001, pp. 137-138).

Nevertheless, intelligence has not always been found as a protective factor; indeed, some life outcomes are ambiguously related to high intellectual abilities (e.g., less number of children and late age of marriage, Reeve, Lyerly, & Peach, 2013; or higher level of myopia, Jensen, 1998). Also, Deary and colleagues (2004) found that men with high cognitive abilities die more often than the

average-intelligence people during their 40s. Furthermore, high intelligence and individual level of alcohol consumption are directly correlated (Belasen & Hafer, 2013). However, high intelligence seems to be a protective factor more frequently than a risk factor (Gottfredson, 1997; Lubinski, Webb, Morelock, & Benbow, 2001).

Beyond the only IQ score, educators and psychologists have begun to integrate CHC broad abilities and specific achievements, especially at school and college (Subotnik et al., 2011). For instance, Lubinski (2010), examining abilities of Stratum II, found that high mathematical and visuospatial abilities increase the likelihood to develop high skills in engineering (Lubinski & Benbow, 2006). Conversely, visuospatial abilities are typically less important in the field of social science, while verbal and mathematical skills play a crucial role. Based on this knowledge, clinicians and practitioners could recognize students' intellectual strengths in order to help them in scholastic orientation processes or provide special education to improve abilities that are needed to pursue personal aims (Warne, 2016). Many school psychologists place particular emphasis on specific intellectual skills rather than on general ability score (e.g., IQ) because of their diagnostic and treatment reliability (McGrew, Flanagan, Keith, & Vanderwood, 1997). For instance, Pfeiffer and colleagues (2000) found that about 90% of school psychologists used WISC-III indexes and subtest profile analysis to interpret children and adolescents' intelligence scores. A growing body of studies has examined the relationship between CHC intellectual abilities and standardized measures of scholastic achievements (i.e., reading, writing, and math). These studies intended to revise the role of *g* factor vs. broad cognitive domains, reflecting theoretical, instrumental and methodological progress in the field of intelligence (McGrew et al., 1997). McGrew and colleagues suggested that specific cognitive abilities could be important for specific scholastic and academic achievements, beyond the role played by general intelligence and achievement skills. Moreover, Flanagan (2000) found that CHC broad abilities explained the variance of reading achievement 25% more than conventional and a-theoretical WAIS-III factors (i.e., Verbal Comprehension, Perceptual Organization, and Freedom from Distractibility). Similar results were obtained administering intelligence tests to assess CHC abilities (e.g., *Ga*, *Gs*, and *Gc*) and standardized measure of reading, writing and mathematical skills (Cormier, Bulut, McGrew, & Singh, 2017; Cormier, McGrew, Bulut, & Funamoto, 2017; Fiorello & Primerano, 2005; Lervåg, Hulme, & Melby-Lervåg, 2017).

1.2 Cognitive Assessment in Gifted Individuals

Intellectually gifted population represents an interesting special group in order to study how high cognitive abilities affect psychological functioning (Rinn & Bishop, 2015; Warne, 2016). Terman's (1926) work represents the milestone of gifted studies. Their longitudinal data have showed that the most capable students had higher likelihood to be healthy, to get a doctorate in the STEM (i.e., Science, Technology, Engineering, and Mathematics) fields, had higher annual income and patented a new technology, and held a tenure-track employment at one of the top universities in the United States of America about 20 years later. Currently, similar works continue to be conducted by Perrone-McGovern and colleagues (2006, 2011, 2012), Lubinski and colleagues (2001, 2006, 2010), and others.

1.2.1 Definition and Identification of Intellectual Giftedness[4]

Cognitive performances of gifted adults are rarely examined in the scientific literature (Perrone-McGovern et al., 2011; Rinn & Bishop, 2015). Empirical studies on people with exceptional abilities are often conducted in educational contexts, involving children or adolescents (Bessou, Montlahuc, Louis, Fourneret, & Revol, 2005; A. S. Kaufman, 1992; Lohman, Gambrell, & Lakin, 2008; Molinero, Mata, Calero, García-Martín, & Araque-Cuenca, 2015; Vaivre-Douret, 2011). The reasons why giftedness in adulthood has received less attention than in childhood are multiple: (a) the definition of intelligence – largely debated in general – becomes more problematic and critical (Ackerman, 2017); (b) the identification process of gifted students often considers also measures of scholastic achievements and teachers' recommendations (Carman, 2013); (c) the clinical or educational utility of this individual characteristic is less immediately related to the overall psychological functioning (Perrone-McGovern et al., 2011).

Giftedness is a broad term which refers to individuals with advanced skills (Sternberg & Davidson, 2005). In 2010, the National Association for Gifted Children released an official statement, giving a comprehensive definition of this term; gifted people "demonstrate outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence (documented performance or achievement in top 10% or rarer) in one or more domains. Domains include any structured area of activity with its own symbol system (e.g., mathematics, music, language) and/or set of sensorimotor abilities (e.g., painting, dance, sports)".

Many theoretical models have been proposed in order to identify main psychological features of gifted individuals (Gagné, 2005; Renzulli, 1978; Ruf, 2005; Simonton, 2008; Wellisch & Brown, 2012). Relative to intellectual giftedness, the definition and operationalization have focused differently about the emphasis placed on scholastic achievement or intellectual abilities. For some authors, giftedness is a product of high potential and extraordinary performances, while others separate high potential (giftedness) and achievement (talent). For instance, the Differentiated Model of Giftedness and Talent (DMGT) (Gagné, 2000, 2005) suggested that high intellectual potential and extraordinary scholastic achievements are different aspects of individual functioning; indeed, exceptional intellectual abilities (but also creativity or socio-affective potential) may not necessarily develop into superior scholastic accomplishments because of multiple factors that can interfere such as motivation, innate dispositions, and the external environment. Other authors suggested that intellectual giftedness cannot be identified through superior skills. For instance, Renzulli, (1978) proposed the Three-Ring Model where he has described giftedness as a product of interactions of high intellectual or learning abilities (i.e., top 15% in one or more areas), creativity and task commitment. The combination of these three aspects is not always present but it occurs in certain conditions and at a certain time. Limitations of these models are often related to the overlooking of some specific sub-groups of gifted; for instance, unlike Gagne's model, underachieving students are often overlooked. This category of students refers to those children or adolescents with superior intellectual abilities who are not able to obtain high scholastic achievements and they are not recommended for gifted education from their teachers. The lack of correspondence between cognitive abilities and scholastic attainment may be the consequence of multiple factors such as parental income, learning or physical impairments, socio-emotional problems, or also a certain

[4] A slightly modified version of the rest of the chapter has been published as Lang, M., Matta, M., Parolin, L., Morrone, C., & Pezzuti, L. (2017). Cognitive Profile of Intellectually Gifted Adults: Analyzing the Wechsler Adult Intelligence Scale. *Assessment*. http://doi.org/10.1177/1073191117733547

reluctance to display own talent to others (Francis et al., 2016). One approach to identifying this kind of gifted students is to use IQ test scores rather than performances in scholastic tasks.

Based on these considerations, Gridley and colleagues (2003) defined intellectual giftedness within the CHC Theory of Intelligence, which considers empirical evidence on cognitive abilities and intelligence (Schneider & McGrew, 2018). Intellectually gifted individuals "demonstrate (a) a high performance in general intellectual abilities and/or (b) an exceptional potential in specific intellectual abilities and/or (c) exceptional general or specific school attitudes" (Gridley et al., 2003, p. 290). This definition does not "focus on the genetic causes of gifts, but rather…on gifts as intellectual abilities and talents as special academic aptitudes being of equal value in their need for nurturing and development" (pp. 290-291). Similar attention to gifted students who may not show exceptional performances at school can be found in Subotnik and colleagues' (2011) definition of giftedness; they defined this phenomenon as (1) high academic achievement; (2) obtaining a score of at 130 on intelligence tests (e.g., Wechsler scales); (3) demonstrating an exceptional talent in one area of ability or (4) superior intellectual abilities and specific socio-emotional functioning. So, giftedness can be identified through standardized intelligence tests.

1.2.2 Cognitive Profiles of Intellectually Gifted Individuals

Most researchers agree that a high IQ score cannot be the only measure to assess intellectual giftedness (Gagné, 2005; S. B. Kaufman & Sternberg, 2008; Renzulli, 2005). There are some limitations on using a threshold for intelligence test scores as a criterion of high intellectual abilities. First, a single composite score is reductionist because psychological assessment needs to consider many variables that reflect different aspects of individual functioning. Second, the cut-off score (i.e., IQ score $\geq$ 130) is arbitrary (McIntosh et al., 2012) and confidence intervals are often not considered. Third, exceptional intellectual skills can be associated with lower abilities within the same cognitive profile and practitioners may struggle with the idea that a gifted student can show a significant weakness in one cognitive area. In particular, there is no consensus on a single cut-off score for the identification of intellectual giftedness using performance-based tests (e.g., IQ tests). The lack of agreement is quite evident considering empirical studies on it. The value of 130 (equivalent to 2.28% of the general population) is generally employed as the psychometric definition of intellectual giftedness (Vaivre-Douret, 2011) and it corresponds to two standard deviations above the mean (for example, a score of 100 on Wechsler Scales or on Kaufman Assessment Battery). However, other authors have used different values: for Antshel and colleagues (2009) the cut-off is 120, for Fishkin, Kampsnider, and Pack (1996) is 127, for Karnes and Brown (1980) is 119, for Terrassier (1999) is 125. This small consensus makes problematic both to estimate similarities and differences across different researches and to interpret giftedness studies globally. Based on Gridley and colleagues' definition of high intellectual abilities, I will consider as gifted people who score 130 in one composite index of an intelligence test. Rizza, McIntosh, and McCunn (2001) explicitly suggested the use of this criterion when they studied gifted students' cognitive performances on the WJ III.

In the current study, I employed the WAIS-IV (Wechsler, 2008a); this is one of the most commonly used intelligence scales for adults. However, this test is not generally used to identify gifted individuals. Indeed, a small amount of studies on high intelligence people has been conducted and none of them was published in a scientific journal. Results obtained by 34 gifted adults were described in the "Technical and Interpretive Manual of WAIS-IV" (Wechsler, 2008b). Inclusion criteria for this group were: a) obtaining a measure of cognitive ability (e.g., FSIQ on WAIS-IV) of two standard deviations above the mean or b) being a Mensa member and have received special

education for gifted students at the school. They showed an average IQ score of 126.5 and their highest performances were in verbal subtests (*M* = 127.2). In contrast, the lowest results were obtained in processing speed tasks (*M* = 112.4). According to previous studies, this pattern of performance reflects the high degree to which gifted individuals "have learned practically useful knowledge and mastered valued skills" (Schneider & McGrew, 2018) and their tendency to have an accurate response style in solving tasks rather than placing emphasis on speed (Cepeda, Blackwell, & Munakata, 2013; Rimm, Gilman, & Silverman, 2008; Sparrow & Gurland, 1998).

Cognitive profiles of gifted children or adolescents have been examined more widely than in adulthood. Overall, gifted children tend to show higher scores in all intelligence tests; they have specific strengths in verbal comprehension and knowledge acquisition, spatial processing, and fluid reasoning. Moreover, they tend to obtain higher scores in working memory and processing speed tasks than general population (Elliott, 2007; Kaufman & Kaufman, 2004), even though these results are lower than the other measures (Raiford, Weiss, Rolfhus, & Coalson, 2008; Rowe, Kingsley, & Thompson, 2010). This means that these last two abilities may not be representative of gifted individuals' intellectual profile. Results of 95 intellectually gifted pupils (age range: 6-16 years) were included in the "Technical Manual of WISC-V" (Wechsler, 2014). Compared to a comparison group, they showed an average IQ score of 127.5. Additionally, gifted students displayed large differences in the five Indexes, showing higher scores on crystallized intelligence (M = 127.7), similar performances on fluid reasoning and spatial processing (*M* = 120.3 and 121.2, respectively) and lower results on working memory and processing speed (*M* = 117.9 and 112.9, respectively). Other studies on the intellectual profile of students with extraordinary intellectual abilities have confirmed comparable patterns on Wechsler scales (Reams, Chamrad, & Robinson, 1990; Rimm et al., 2008; Wechsler, 2003). Moreover, this pattern is mostly analogous to the performances of gifted adults. Silverman (2009) noted that about 70% of the children who applied for gifted education had obtained processing speed scores in the average range or below. Scores on Processing Speed Index can decrease IQ scores and affect the identification of gifted students who are often identified through this single measure. Large and significant discrepancies between fluid reasoning/verbal comprehension and processing speed were also found in the gifted special sample of the Woodcock Johnson III (WJ III) (Mather & Woodcock, 2001; Rizza et al., 2001).

Lastly, validity studies of Stanford-Binet 5 (SB 5) (Roid, 2003) considered the performance of a gifted group. This group was composed of students with high IQ scores and recommended by their teachers. They showed an average IQ of 123.7 and their working memory score was found as an individual weakness (115.8 vs. median factor score of 121; p. 97). Additional regression analyses on SB 5/WJ III Achievements (WJ III ACH) linking sample showed that fluid intelligence and quantitative reasoning predicted scholastic achievements better than working memory abilities.

In addition, the intellectual profile can be examined more deeply using scatter measures which allow identifying individual strengths and weaknesses. Although these measures might have lost importance among scholars (Watkins, 2005), some clinicians and practitioners tend to consider them during the cognitive assessment (Binder, Iverson, & Brooks, 2009; Oakes, Lovejoy, Tartar, & Holdnack, 2013). Generally, scatter measures refer to: (a) difference between two test scores, such as between the highest and the lowest index, or between two subtests of interest; (b) degree of overall variability among all subtests and among Indexes, or the difference of each score against the average performance (Matarazzo, Daniel, Prifitera, & Herman, 1988; Oakes et al., 2013). An estimate of how intelligence test scores are distributed around the individual mean may be relevant because, for example, if the variability among subtests or Indexes is large, resultant composite

indexes could be inaccurate descriptors of individual performances on a test (Lohman et al., 2008; Oakes et al., 2013). Indeed, IQ score is a good indicator of one's intellectual profile if it "represents a cohesive set of scaled scores, each reflecting slightly different or unique aspects of the ability" (Lichtenberger & Kaufman, 2009, p. 167).

Gifted individuals tend to display large discrepancies across different intellectual domains. Matarazzo and Herman (1985) reported results of adults who had obtained an IQ score equal to or greater than 120. About 25% of individuals showed differences greater than 15 points between Verbal and Performance IQ score (i.e., VIQ and PIQ, respectively) in both directions. Among them, approximately two third had VIQ score higher than PIQ. Similar discrepancies were found on the WAIS-III results (Kaufman & Lichtenberger, 2006). Slightly more than half of the individuals with superior IQ score (i.e., IQ ≥ 120, according to Wechsler's classification; Wechsler, 2008a) showed differences equal to or greater than 9 points. Furthermore, discrepancies of at least 17 points (considered unusually large) were present in 20% of this special group, whereas they occur in the 15% of the cases of the general population. Lastly, the American group of intellectually gifted showed larger variability across WAIS-IV Indexes than the matched comparison group (Oakes et al., 2013).

Unusual discrepancies among intellectual abilities have been systematically found also in performances of gifted children and adolescents. According to the "Interpretative Manual of the WISC-IV", intellectually gifted children showed a specific cognitive profile where Verbal Comprehension (VCI) and Perceptual Reasoning (PRI) were significantly higher than the other Indexes (Wechsler, 2003). In particular, VCI and PRI score were in the gifted range (i.e., 99th percentile), while Processing Speed Index was ranked at the 91st percentile. Rimm and colleagues (2008) found an average discrepancy of about 27 points between verbal knowledge and processing speed measures. According to Flanagan and Kaufman's criteria (2004) of cohesive IQ (i.e., the threshold of 23 points, corresponding to one and a half standard deviation), about 44% of gifted students obtained an IQ score composed of a significant discrepancy between the highest and the lowest ability score. In line with the Law of Diminishing Returns (SLODR; Saklofske, Yang, Zhu, & Austin, 2008; Spearman, 1927), the more IQ increases the more discrepancies become bigger. Also, this means that high intelligence individuals have more discordant ability profiles because their subtest scores tend to be less strongly correlated with one another. Analogous findings were found in samples of gifted in relation to different nationalities (Molinero et al., 2015) and other intelligence tests (Bessou et al., 2005).

1.2.3 Research Questions and Hypotheses

In my first research, I had three main objectives: (a) to examine cognitive performances of intellectually gifted adults on the most recent edition of Wechsler Adult Intelligence Scale (i.e., WAIS-IV, Wechsler, 2008, ed.it. Orsini & Pezzuti, 2013), comparing their results to a control group individually matched for age, gender and level of education, randomly selected from the Italian standardization sample of the test; (b) to obtain data on the pattern of performance of gifted individuals across the four intellectual domains assessed by the WAIS-IV and compare it with the average-intelligence group; (c) to examine differences in WAIS-IV scatter scores between the two groups.

Based on previous studies on gifted adults and children (Molinero et al., 2015; Rizza, Gridley, & Kipfer, 1998; Wechsler, 2003, 2008), I hypothesized that gifted individuals will obtain higher scores on all subtests and composite Indexes with the highest effect size for verbal tasks and the smallest effect size associated with processing speed measures (PSI). Moreover, people with IQ in

the gifted range will show a different pattern of performance compared to the comparison group and larger discrepancies across subtests and the four broad intellectual abilities assessed by the WAIS.

1.3 Method

1.3.1 Participants

Data for 130 intellectually gifted adults (79 men, equivalent to 60.77% of the sample) were collected for this study. Distribution by gender of the participants is reported in Table 1.1

Table 1.1 Distribution by gender for the intellectually gifted group.

	Gifted Men	Gifted Women
N	79	51
Age in years (mean ± SD)	34.24 ± 10.49	35.87 ± 12.91
Age range	19 - 60	18 - 58
Level of Education in years, *n* (%)		
0-12 (Less than High school)	0	7 (13.73)
13-15 (High school or equivalent)	27 (34.18)	13 (25.49)
16-17 (Bachelor's Degree)	10 (12.66)	4 (7.84)
18+ (Master's Degree, Doctorate or More)	41 (51.90)	25 (49.02)

Gifted participants were selected from the Italian standardization sample of the WAIS-IV (Orsini & Pezzuti, 2013), clients who were administered an intelligence test during a psychological consult at A.R.P. (Association for the Research in clinical Psychology)[5] or were members of the Mensa Italia Association[6]. Based on Gridley and colleagues' definition (2003), obtaining a score of at least 130 on one WAIS-IV composite score (VCI, PRI, WMI, PSI or FSIQ) was the inclusion criteria for the gifted group. Participants' range age was between 18 and 60 years (M = 34.87, SD = 11.50), and the level of education was essentially distributed between high school and college (Table 1.2).

To examine the performance of the gifted group, a comparison group was randomly selected from the Italian standardization sample of the WAIS-IV (Orsini & Pezzuti, 2013). This group was individually matched with the gifted group. Thus, the comparison group had the same age, gender, and level of education. The two groups had the same sample size and reciprocally exclusive. Only individuals who obtained results lower than 130 in all WAIS-IV Composite scores might compose the control group.

[5] Each client who requires a psychological assessment at A.R.P. (private clinic in Milan, IT) is administered an intelligence test, following principles of multimethod assessment (Hopwood & Bornstein, 2014).

[6] Mensa is an international association for people who have scored above the 98th percentile on a reliable intelligence test, administered by a licensed psychologist. Typically, people can join Mensa in two alternative ways: taking the Mensa test, or submitting their own score obtained from another well-validated intelligence test.

Table 1.2 Distribution of socio-demographic variables (i.e., gender, age and level of education) of both groups.

	Gifted Group	Comparison Group
N	130	130
Sex men, *n* (%)	79 (60.77)	79 (60.77)
Age in years (mean ± SD)	34.87 ± 11.50	34.87 ± 11.50
Age range	18 - 60	18 - 60
Level of Education in years, *n* (%)		
0-12 (Less than high school)	7 (5.38)	7 (5.38)
13-15 (High school or equivalent)	40 (30.77)	40 (30.77)
16-17 (Bachelor's Degree)	16 (12.31)	16 (12.31)
18+ (Master's Degree, Doctorate or more)	66 (50.77)	66 (50.77)
Participants, *n* (%)[a]		
A.R.P. Milan, IT	24 (18.46)	0
Mensa Italia Association	97 (74.61)	0
Italian WAIS-IV standardization sample	9 (6.92)	130 (100)
Index ≥ 130, *n* (%) [b]		
Full-Scale IQ	82 (63.08)	
Verbal Comprehension Index	34 (26.15)	
Perceptual Reasoning Index	72 (55.38)	
Working Memory Index	43 (33.08)	
Processing Speed Index	49 (37.69)	
Indexes ≥ 130, *n* (%)[c]		
1 Index	75 (57.69)	
2 Indexes	44 (33.85)	
3 Indexes	9 (6.92)	
4 Indexes	2 (1.54)	

[a] Provenance of the gifted group.
[b] Indexes equal to or greater than 130 per single participants. The sum of Indexes exceeds the total number of gifted individuals because one can have more than one Index higher than 130.
[c] Number of Indexes for each participant equal to or greater than 130. The sum of Indexes corresponds to the number of gifted individuals in the present study because one participant had a specific number of Indexes higher than 130.

1.3.2 Measure and Procedures

The WAIS-IV (Wechsler, 2008a, ed.it. 2013) was administered to a gifted group. This intelligence test is composed of 10 standard subtests that assess four cognitive abilities: Similarities, Vocabulary, and Information compose the Verbal Comprehension Index (VCI); Block Design, Matrix Reasoning, and Visual Puzzle evaluate the Perceptual Reasoning Index (PRI); Digit Span and Arithmetic assess the Working Memory Index (WMI); Symbol Search and Coding constitute the Processing Speed Index (PSI). The sum of the four Indexes allows measuring the Full-Scale Intelligence Quotient (FSIQ). The WAIS-IV has also five additional subtests: Comprehension for VCI, Figure Weights and Picture Completion for PRI, Letter-Number Sequencing for WMI and Cancellation for PSI. Additional tasks can be used to replace standard subtests when practitioners suspect that one's score might be biased because of current circumstances (e.g. loud sounds during

the administration of the test) (Lichtenberger & Kaufman, 2009). Combining the four Composite scores, the WAIS-IV provides two measures clinically useful. First, the General Ability Index (GAI) indicates a good level of abstract and visual spatial reasoning, and verbal problem solving. It can be employed as a substitute of the FSIQ for people with poor performances exclusively on Processing Speed and Working Memory Indexes (Bremner, McTaggart, Saklofske, & Janzen, 2011; Pezzuti, 2016). Second, the Cognitive Proficiency Index (CPI) is a valid measure of the Working Memory and Processing Speed Indexes and it refers to a set of abilities related to information-processing proficiency. An effective processing through rapid visual speed and mental control can reduce the cognitive load for new tasks, facilitating fluid reasoning and learning of new material (Bremner et al., 2011; Holdnack, Drozdick, Weiss, & Iverson, 2013; Logue et al., 2015).

1.3.3 Ethical Statements

All participants were recruited on a voluntary basis and they gave a written informed consent before testing. The study was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and fulfilled the ethical standard procedure recommended by the Italian Association of Psychology (AIP). The study was approved by Ethics Committee of Milan-Bicocca University.

1.3.4 Data Analysis

Intellectual Abilities of Gifted Group on WAIS-IV. Multiple independent samples t-tests were conducted on the scaled scores of each subtest and Composite score to examine the differences between cognitive performances of gifted individuals and the comparison group. I performed a Bonferroni correction, dividing the critical p-value ($\alpha = 0.05$) by the number of comparisons (new $\alpha = .002$). The magnitude of effect sizes (Cohen's *d*; Cohen, 1988) was also reported.

Pattern of Performance across the four WAIS-IV Cognitive Domains. I used a multivariate approach to repeated measures analysis to study the pattern of performance of the two groups.

WAIS-IV Scatter Measures. Multiple independent samples t-tests were performed to compare subtest and Index scatter scores between the gifted individuals and the group composed of people with an IQ in the average range. These aspects of the cognitive performance indicate: (a) the score differences between two subtests and between the lowest and the highest broad cognitive abilities; (b) the degree of general variability among all subtests and Indexes, or the difference between one single subtest score and the level of average performance (Crawford, Garthwaite, & Gault, 2007; Oakes et al., 2013).

1.3.5 Results

Results were calculated using WAIS-IV Italian normative data (Orsini & Pezzuti, 2013). Multiple independent t-tests were performed to study individual differences between intellectually gifted and average-intelligence people (Table 1.3).

Group scores were normally distributed. After performing Bonferroni correction, intellectually gifted adults displayed superior performance in all WAIS-IV subtests and Indexes compared to the matched group. These results confirmed my first hypothesis. Overall, effect sizes were large. At subtest level, Matrix Reasoning, Block Design and Visual Puzzle (Cohen's $d = 1.62$, 1.55 and 1.55, respectively) had the largest effect sizes, whereas Cancellation and Picture Completion (Cohen's $d = 0.41$ and 0.58, respectively) showed the lowest ones. At Index level, the gifted group showed higher scores in all four broad cognitive domains; the highest score was obtained on Perceptual Reasoning Index (Cohen's $d = 2.17$), whereas the lowest score was associated to Processing Speed

Index (Cohen's d = 1.38). Moreover, Full-Scale IQ, GAI, and CPI were also significantly higher and had large effect sizes than the comparison group (Cohen's d = 2.78, 2.12 and 1.76, respectively).

Table 1.3 WAIS-IV Group Differences on Subtest and Index Scores. The asterisk indicates supplementary subtests.

	Gifted Group		Matched Group				
Tests	*M*	*SD*	*M*	*SD*	*t*	*p*	Cohen's *d* [95% CI]
Verbal Comprehension Index	121.88	10.80	107.48	10.06	11.13	<.001	1.38 [-0.47, 3.11]
Similarities	13.23	2.32	10.82	2.34	8.34	<.001	1.04 [0.64, 1.44]
Vocabulary	14.15	2.19	11.81	2.37	8.25	<.001	1.02 [0.65, 1.44]
Information	13.85	2.65	11.15	2.29	8.79	<.001	1.09 [0.64, 1.49]
*Comprehension	14.53	2.21	12.32	2.39	7.74	<.001	0.96 [0.58, 1.37]
Perceptual Reasoning Index	129.37	10.58	106.45	10.54	17.50	<.001	2.17 [0.36, 3.99]
Block Design	14.78	2.72	10.92	2.24	12.51	<.001	1.55 [1.09, 1.94]
Matrix Reasoning	14.82	1.98	11.19	2.47	13.10	<.001	1.62 [1.29, 2.05]
Visual Puzzle	14.63	2.11	11.10	2.44	12.46	<.001	1.55 [1.19, 1.97]
*Figure Weights	14.55	2.38	11.11	2.82	10.65	<.001	1.32 [0.91, 1.81]
*Picture Completion	12.29	3.03	10.43	3.36	4.67	<.001	0.58 [0.06, 1.16]
Working Memory Index	122.08	12.70	105.41	10.30	11.63	<.001	1.44 [-0.74, 3.22]
Digit Span	13.51	2.85	10.92	2.41	7.92	<.001	0.98 [0.50, 1.40]
Arithmetic	14.07	2.27	10.98	2.32	10.85	<.001	1.35 [0.96, 1.75]
*Letter-Number Sequencing	13.95	2.96	11.54	2.81	6.70	<.001	0.83 [0.33, 1.32]
Processing Speed Index	122.69	13.89	105.78	10.34	11.13	<.001	1.38 [-1.00, 3.16]
Symbol Search	13.65	3.03	10.85	2.04	8.74	<.001	1.08 [0.57, 1.44]
Coding	14.55	2.86	11.22	2.46	10.07	<.001	1.25 [0.76, 1.68]
*Cancellation	11.62	2.14	10.69	2.39	3.28	.001	0.41 [0.04, 0.82]
Full Scale IQ	131.27	7.99	108.13	8.66	22.39	<.001	2.78 [1.41, 4.28]
General Ability Index	128.31	10.11	107.90	9.13	17.09	<.001	2.12 [0.44, 3.67]
Cognitive Proficiency Index	126.16	11.60	106.23	11.04	14.19	<.001	1.76 [-0.23, 3.66]

I tested my second hypothesis using a repeated measures analysis of variance. My aim was to examine the pattern of performance across the four WAIS-IV intellectual abilities of gifted individuals compared to the matched comparison group. All statistical assumptions were met. The analyses exhibited a statistically significant interaction between group and cognitive domains (F(3, 256) = 9.533, p = .002). Post-hoc comparisons were computed to evaluate differences among specific intellectual abilities for each group. As I expected, no differences were found across intellectual abilities of the control group. On the contrary, gifted group's Perceptual Reasoning Index was statistically significant higher than the other Indexes, VCI (p < .001), WMI (p < .001), and PSI (p < .001) (Figure 1.1).

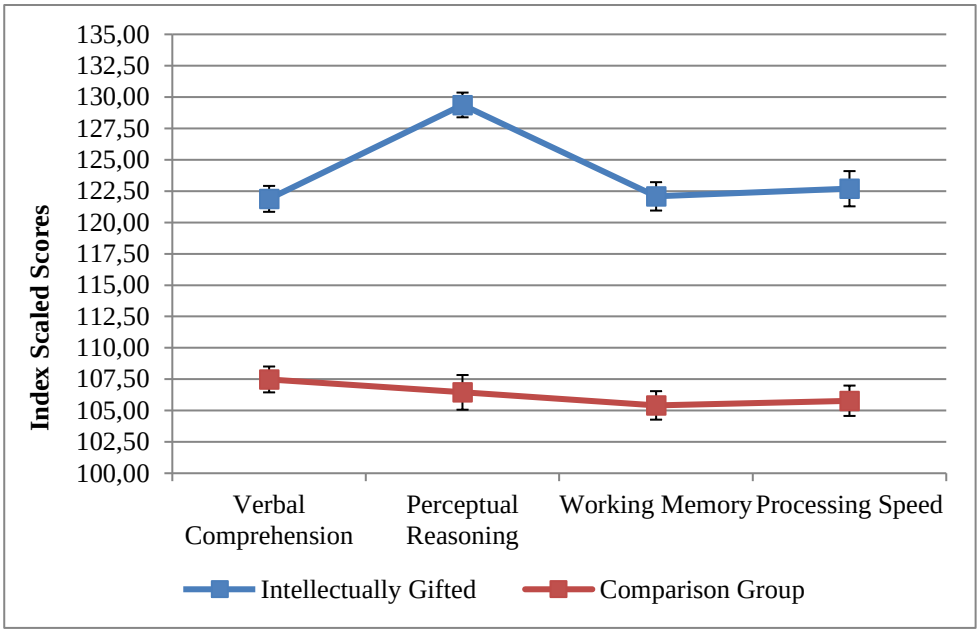

Figure 1.1 Pattern of performances on WAIS-IV Broad Cognitive Abilities. Index bars represent standard error of each Index.

Finally, I tested my third hypothesis about differences on scatter measures between the two groups. I computed the variability (i.e., standard deviation) of 10 WAIS-IV standard subtests, the average of the highest and the lowest subtest scores, and the difference between the lowest and the highest scores. The same statistics were computed for the Indexes. Multiple independent samples t-tests were computed and p-values were corrected according to Bonferroni formula (new α =.006) (Table 1.4).

Table 1.4. WAIS-IV Group Differences on Scatter Measures.

	Gifted Group		Matched Group				
Scatter	*M*	*SD*	*M*	*SD*	*t*	*p*	Cohen's *d* [95% CI]
Subtest SD	2.38	0.65	2.10	0.52	3.94	<.001	0.49 [0.37, 0.57]
Lowest Subtest Mean	10.32	1.98	7.78	1.58	11.42	<.001	1.42 [1.08, 1.70]
Highest Subtest Mean	17.75	1.07	14.41	1.61	19.69	<.001	2.44 [2.27, 2.73]
Max-min Subtest Mean	7.42	2.19	6.62	1.86	3.18	.002	0.39 [0.02, 0.72]
Index SD	11.68	4.37	8.36	3.32	6.90	<.001	0.86 [0.11, 1.43]
Lowest Index Mean	110.96	9.70	96.95	8.33	12.50	<.001	1.55 [-0.11, 2.99]
Highest Index Mean	137.08	5.49	115.60	7.36	26.67	<.001	3.31 [2.38, 4.59]
Max-min Index Mean	26.12	9.90	18.65	7.72	6.77	<.001	0.84 [-0.86, 2.17]

In line with my third hypothesis, the gifted group showed significantly greater variability in all scatter measures. Additionally, a chi-square statistic was conducted to test if groups were differently distributed considering IQ score cohesiveness (difference of 38 points based on the WAIS-IV Italian standardization sample, Orsini, Pezzuti, & Hulbert, 2015). The relation between group and IQ cohesiveness was statistically significant, χ^2 (2, N = 260) = 10.637, p = .001. Thus, the IQ score of gifted adults is less cohesive than the IQ score of individuals with intelligence in the average range. That means that IQ score could not be the best indicator to describe cognitive performances of gifted individuals.

1.4 Discussion

This research had three main aims: (1) to examine cognitive performances of gifted adults based on their results on the WAIS-IV; (2) to confirm the pattern of performance across the four intellectual abilities assessed by the test (i.e., higher crystallized intelligence and lower processing speed); (3) to compare their variability across different subtests with the control group.

First, the gifted group scored significantly higher in each WAIS-IV subtest and Index. This result was not surprising because the gifted group was composed of individuals with advanced abilities and they typically show superior performances on intelligence tasks (LaForte et al., 2014; Roid, 2003; Wechsler, 2014b). However, this finding confirmed that the WAIS-IV can be a good measure to assess intellectual giftedness in adulthood. Clinical utility of these results might be particularly relevant when practitioners need to assess "twice-exceptional" (2e) gifted adults. This term refers to individuals who have high intellectual potential but also manifested psychological issues, such as learning disabilities (Toffalini, Pezzuti, & Cornoldi, 2017), attention-deficit/hyperactive disorders (Gentry & Fugate, 2017), or psychopathological diseases (Webb et al., 2016). Indeed, intellectual giftedness and psychological issues can co-occur. Although gifted individuals tend to score higher on all intellectual domains, twice-exceptional individuals could have delimited weaknesses that could hide usual exceptional cognitive performances and would deserve further investigations to be correctly diagnosed (e.g., gifted students with learning disabilities tend to show lower scores on working memory and processing speed tasks, Gilman et al., 2013). Future research should examine intellectual performances of twice-exceptional individuals also in adulthood.

The gifted group showed the highest results on all standard perceptual reasoning subtests. According to Weiss and colleagues (2013), this means that gifted people have intellectual strengths in solving problems that are not based on previous knowledge, schemas, or scripts and involving attentional control and other executive functions. They can observe pattern of behaviors and understand underlying rules or principles (i.e., inductive reasoning); they can also use visuospatial simulation (e.g., representing spatial models, mental object rotations, movements prediction, etc.). Individuals who have high perceptual reasoning abilities can solve problems with creativity and unusual insights. Furthermore, their tendency to solve problems involving visual strategies could be so well-developed and automatic that it may change the ability that practitioners and psychologists wish to measure administering specific intelligence tasks (Mann, 2004). For instance, they could perform extremely well in recalling series of random numbers (e.g., digit span task) not only because their superior level of short-term memory but also because they use idiosyncratic strategies to storage and recall all the digits, based on fluid reasoning skills (e.g., mental visualization, applying sophisticated mathematical rules, etc.). The absence of perceptual reasoning-related abilities in gifted literature is quite astonishing, considering the close relation between fluid reasoning and general intelligence (Cattell, 1987; Kvist & Gustafsson, 2008; Schweizer, Troche, & Rammsayer, 2011). For example, Raven's Progressive Matrices task (Raven & Court, 1998, ed.it. 2007), equivalent to Matrix Reasoning, has showed regularly the highest loading on g factor (i.e. general factor of intelligence) (Deary & Smith, 2004; Eysenck, 1998; Jensen, 1998; Vernon, 1983).

Although the structure of the WAIS-IV considers three perceptual reasoning subtests as indicators of the same cognitive domain, confirmatory factorial analyses showed that they are measures of two different broad intellectual abilities; in particular, Block Design and Visual Puzzle may assess visual processing (*Gv*) and Matrix Reasoning may measure of fluid reasoning (*Gf*) (Weiss et al., 2013). Nevertheless, using PRI as an indicator of two distinct cognitive abilities should also be done cautiously because of cross-loadings of single tasks on both abilities. For instance, Matrix

Reasoning (and Figure Weights) show small but substantial loadings on *Gv* and *Gf* (Keith, Fine, Taub, Reynolds, & Kranzler, 2006; Weiss et al., 2013) and many psychologists and scholars pointed out the component of abstract reasoning involved in Block Design (Carroll, 1993; Cohen, Fiorello, & Farley, 2006; McGrew & Flanagan, 1996; Willis, 1996). In the fourth edition of the Wechsler scales, "constructs for *Gf* and *Gv* appeared mixed, making identification of a pure fluid intelligence factor and a pure visual processing factor questionable" (Chen, Keith, Chen, & Chang, 2009, p. 94).

Contrary to previous findings (Molinero et al., 2015; Rimm et al., 2008; Sparrow, Newman, & Pfeiffer, 2005; Wechsler, 2008b), in the current study gifted group did not show the best performance on verbal knowledge and comprehension tasks. Effect sizes associated with crystallized intelligence and processing speed were identical. This result does not correspond to any other studies on cognitive abilities of gifted individuals. Indeed, gifted tend to show the highest performances in verbal tasks and the lowest in processing speed. The gifted sample of the Manual of the WJ IV (Woodcock-Johnson IV) obtained results partially similar. The group was composed of 53 students (age range: 5-9 years) who were involved in gifted education or were admitted in schools for high ability students. Consistently, they scored above the average in all subtests (i.e., 115 or higher). Contrary to the Wechsler scales, their fluid reasoning score (M = 119.7) was higher than their crystallized intelligence (M = 111.2). Similar results were reported for the gifted group on the WJ III (Margulies & Floyd, 2009). However, these results cannot provide a global picture of the intellectual profile of gifted population because the authors did not administer all subtests to them. Indeed, a diagnostic group-targeted approach was employed for clinical groups presented in the manual (i.e., administration of subtests clinically relevant and high level of sensitivity). Gifted students were administered tasks to assess only two broad abilities within the CHC model i.e., crystallized intelligence (*Gc*) and fluid reasoning (*Gf*). For this reason, I cannot confirm my results based on the performance of this gifted group; yet, I cannot know if gifted individuals would obtain visual processing scores higher than crystallized intelligence.

One reason that may help to explain the divergence between our results and most of the studies on intellectual profiles of gifted is the criteria used to identify this special group; indeed, gifted groups have been often composed considering the IQ score only. However, according to Gridley and colleagues (2003), I selected people who obtained high scores also on single cognitive abilities, such as crystallized intelligence or fluid reasoning. This view is coherent with recent models of intellectual giftedness; exceptional intelligence should be recognized considering multiple cognitive strengths and abilities (Davis & Rimm, 1994; Renzulli & Reis, 1997). This method allows detecting different ways to be gifted. Moreover, it reflects an effort to surpass the classic view of brilliant gifted students who show exceptional scholastic attainments (Park, Lubinski, & Benbow, 2013), and obtain a high score in verbal tasks (Molinero et al., 2015; Sparrow & Gurland, 1998; Wechsler, 2003b, 2008b). This conception of gifted students can be useful in some cases but it may overlook that high intellectual functioning are not always followed by exceptional scholastic achievements; in fact, there are many students who are underachievers or decide not to apply for a college. This may make gifted studies biased and prevent generalizability of the results. According to these considerations, the gifted group presented in this research may be more illustrative of the variety of individuals who may have exceptional intellectual abilities without being necessarily aware of that. Yet, the gifted population is also made up of people who may have never realized the reason why they have felt different from others, "out-of-sync" with friends, other students, and teachers at school, or colleagues and bosses at work. Empirical studies should be addressed to assess negative

consequences on learning processes and psychological functioning comparing gifted individuals who were or were not supported in childhood.

Gifted individuals showed the lowest effect sizes on processing speed tasks. This is consistent with previous studies (Rowe, Dandridge, Pawlush, Thompson, & Ferrier, 2014; Wechsler, 2008b). They also tend to show large individual variability in these simple and repetitive tasks. Non-intellectual factors may contribute to explain uneven performances in this kind of tasks, such as a reflective intellectual style (Mann, 2004), poor motor coordination (Wechsler, 2008b), perfectionism or lack of motivation (Fletcher & Speirs Neumeister, 2012). Moreover, processing speed tasks penalize people who tend to prefer strategies that involve the analysis of details or need to check frequently their answers. These weaknesses may be also considered to other tasks that need to be solved in a certain amount of time; indeed, the answer can also be considered wrong if given over the time. For instance, the time-limit for Visual Puzzle is 30 seconds for most items. This means that if the examinee gives a right answer one second late, that is considered wrong. I think it is legitimate to question if this is the right method to assess visual processing ability. For this reason, I believe that the interpretation of intelligence test scores should always need well-trained psychologists or practitioners who are able to consider all aspects of one's performance. Another interpretation of lower results in processing speed tasks is related to statistical characteristics of the WAIS-IV; indeed, PSI has the smallest loadings on the general factor (*g*) scores and these subtests have some of the lowest reliability of any subtests scores of the intelligence scale (Jensen, 1998; Kane, Conway, Miura, & Colflesh, 2007; te Nijenhuis et al., 2016).

Thus, gifted individuals showed the lowest effect sizes on Cancellation and Picture Completion. These results are in line with the American gifted group described in the Technical Manual of the WAIS-IV (Wechsler, 2008b). The two tasks are similar for many reasons and these aspects could contribute to explain the reason why gifted group obtains lower scores on those: a) small loadings to the general factor of intelligence (Kane et al., 2007; Weiss et al., 2013); the smaller a task loads on g, the less it may be a marker of high cognitive functioning; b) they are time-limited subtests; cognitive performances of gifted individuals could be affected by the limitation of time because of their relative weaknesses in processing speed ability; c) gifted individuals may be exhausted or bored to resolve tasks; in fact, these two subtests are administered at the end of the battery. I want to underlie that the administration process of the 15 subtests of the WAIS-IV takes from 120 to 150 minutes. Moreover, these tasks could be perceived as not very stimulating and they could generate frequent experiences of boredom and decrease their results (Preckel, Götz, & Frenzel, 2010). Of course, other subtests of the WAIS-IV could have small loadings to the general factor, be time-limited or generate bored or disengagement. My hypothesis here is that all these three aspects together could contribute to make Cancellation and Picture Completion the poorest measure in order to detect intellectually gifted individuals.

Second, gifted individuals displayed a different pattern of performance across the four intellectual abilities compared to individuals with average-intelligence. Statistical analyses reveal that PRI of the gifted group was significantly higher to the other three Indexes. Carroll (1993) pointed out that reasoning abilities are traditionally considered close to the core of what is generally intended by using the term "intelligence". While the relationship between fluid reasoning (*Gf*) and the general factor (*g*) is still unclear, some scholars have suggested that *g* is equivalent to *Gf*, which in turn would be equivalent to induction (Gustafsson, 1988; Kvist & Gustafsson, 2008); even though they were measures of different abilities, there may be enough evidence for strong relationships among them (Baudson & Preckel, 2013). Marshalek and colleagues (1983) used the Radex Model

(Guttman, 1954) to represent that fluid reasoning skills are located at the core of the general intelligence. Applying this model to intelligence test structure shows clearly that the content or the representation modality play a role when subtests are low-level, repetitive, and automatic, whereas these are secondary for more *g*-loaded tasks. Based on this approach, loadings on the *g* factor could be interpreted as measures of the relationship between a task and fluid intelligence (*Gf*) (Horn & Noll, 1997). The Radex Model could explain also the reason why gifted individuals showed the highest effect size in Arithmetic among the three working memory subtests of the WAIS-IV. Although it requires some memory-related abilities, it is located near to fluid intelligence than the other two measures of WMI (Cohen et al., 2006). Analogous evidence was found examining the factorial structure of the WAIS-IV where Arithmetic had stronger loadings on fluid intelligence, and not only on working memory (Weiss et al., 2013).

According to what I have explained so far, I suggest that results of this study might be more coherent with empirical research on intelligence than previous data collected from gifted groups (Molinero et al., 2015; Rowe et al., 2010; Wechsler, 2008b, 2014b). The authors agree about the important role of verbal abilities in the intellectual profile of gifted students. However, this cognitive strength may be an important characteristic of a limited group of individuals with intellectual abilities; they may be students who were able to fit with their scholastic environment and take advantage from it. Holdnack and Weiss (2013, p.180-185) conducted many kinds of statistical analyses on the American standardization sample of the WAIS-IV and they confirmed that the level of education affects the results that people obtain in intelligence tests. These effects are larger for verbal and knowledge measures at the extremes of the distribution (i.e., intellectual disability and giftedness). Thus, VCI has the largest variability among different levels of education. Of course, results that I presented in this chapter may be affected by other limitations (for example, I did not consider information about job or career when I performed the analysis). The age range can also explain differences between my results and other studies in the literature. However, these findings should prevent the tendency to identify gifted individuals from their verbal abilities and overall scholastic achievements. Longitudinal studies could help to examine the potential relationships between an earlier identification and support of one's giftedness and the development of specific intellectual strengths.

Third, variability indicators support that gifted examinees had larger discrepancies across broad cognitive domains than people with average intelligence. Lohman and colleagues (2008) examined cognitive profiles of academically gifted children who were administered the three batteries of the Cognitive Abilities Test. The authors noted that students with exceptional results tended to have a significant weakness in one intellectual ability or they were more likely to present a more uneven pattern of performance. Thus, gifted individuals tended to display more often discrepancies across verbal abilities, nonverbal reasoning, and quantitative memory than others (Molinero et al., 2015; Reynolds, Hajovsky, Niileksela, & Keith, 2011); moreover, they may have different approach to learning, and personal strategies of information processing (Reis & Renzulli, 2011; Reis, Neu, & McGuire, 1997; Sternberg, 1997). High variability in their intellectual profiles may be due to "developmental asynchrony" (Alsop, 2003; Linda Kreger Silverman, 1997). This construct was hypothesized to indicate a pattern of unevenness among cognitive, psychomotor, and emotional domains and has suggested as an indicator of giftedness in childhood. Many scholars proposed that developmental asynchrony may also explain discrepancies within one single intelligence test, which reflects the degree of imbalance across verbal abstraction, fluid reasoning, visual processing abilities, short-term memory and processing speed (Guénolé et al., 2013; Vaivre-Douret, 2011). However, it is unlikely that the same mechanism could explain the intellectual functioning of gifted

adults. Indeed, physiological development and time affect cognitive abilities more in childhood than in adulthood. Tolan (1994) suggested that the term "differentiated development" could be more suitable because intelligence in adulthood is largely influenced by individual preferences, interests, and tendencies. The classic "Investment theory" (Cattell, 1963, 1987) may explain the reason why gifted people obtained a significant discrepancy between fluid reasoning and the other intellectual abilities. Cattell claimed that the intellectual development is initially directed by one general ability, equivalent to *Gf*, which would be related to brain structures maturation and genetic influences. He suggested that learning processes may depend on this broad ability. Later, Cattell (1987) listed other variables which should be considered when explaining individual differences in learning and scholastic attainments, such as motivation, curiosity, interests, parents' level of education and positive relationships with teachers at school. Thus, the investment theory speculates that development of cognitive abilities is sustained by personal experiences, expertise and earlier levels of fluid reasoning. This broad ability would actively support the development and the level of many others; for example, verbal knowledge can increase deducing the meaning of the words from the context (Cain, 2007; Cain, Oakhill, & Elbro, 2003; Landauer & Dumais, 1997). Although the "Investment theory" examines the causal role of fluid intelligence on verbal abilities, other authors speculated that *Gf* might sustain also the development and the acquisition of other broad abilities (Kvist & Gustaffson, 2008; Schneider & McGrew, 2018), such as visual processing (*Gv*).

Moreover, the distribution of socio-demographic variables of the gifted group should be considered to explain similarities and differences between this study and others in literature; yet, associations between individual variability on intelligence tests and background characteristics have been well-established (Deary, Thorpe, Wilson, Starr, & Whalley, 2003; Johnson, Carothers, & Deary, 2008; Oakes et al., 2013). Gender and level of education have been described as two important variables which impact on cognitive abilities measurement. For example, the number of gifted women and men was not equal in this study. This lack of balance is quite common when considering gifted studies. However, this tendency can be found at both extremes of the normal distribution of intelligence (Deary, Irwing, Der, & Bates, 2007; Strand, Deary, & Smith, 2006) and in many other contexts, such as among criminals or mental defectives (Heim, 1970). Multiple hypotheses have been proposed in order to clarify this imbalance, e.g. biological (Shields, 1982), educational (A. Furnham, 2001) or socio-cultural effects (Faria & Fontaine, 1997; Furnham & Gasson, 1998), or as a consequence of methodological artifact (Abad, Colom, Rebollo, & Escorial, 2004). Moreover, if we look at the extreme right of the intelligence distribution (i.e., gifted range), psychological and sociological reasons to be recognized as gifted may be examined. The gifted group of this study was mainly made up of individuals who were previously identified as gifted by the Mensa Association, where gender distribution is already 2:1. Women might not be interested in assessing their cognitive skills because of the influence of social stereotypes on self-perception of their own abilities (Ehrlinger & Dunning, 2003; Furnham & Buchanan, 2005; Sieverding & Koch, 2009). Indeed, individuals decide to join Mensa spontaneously and most of them may be motivated to be known as gifted.

Additionally, the level of education of the group of gifted considered in this study has an unusual distribution compared to others. About one third of individuals had a high school degree or less, which can be odd for people who have been often associated with successful scholastic achievements. Two explanations may be given for this disparity: first, since few gifted individuals were 18-years-old, they were still attending high school or college and they could not claim to have a degree; second, and more interesting, I hypothesize that previous researches on intellectual giftedness could be biased. Indeed, people with high intellectual abilities are often chosen from who

are enrolled in special classes for gifted students; it might be that this sampling method may under represent students with discrepancies between cognitive abilities and scholastic attainments, who could have intellectual potential to stand out (if supported adequately) but cannot do it for some reasons (Francis et al., 2016).

Based on these results, I would like to underline three main points which can orient future studies and provide useful clinical information for practitioners and psychologists when assessing intellectually gifted people. First, the average cognitive performances of the gifted group revealed that all WAIS-IV Indexes had a mean score less than 130; furthermore, they had larger discrepancies among intellectual domains, compared to average-intelligence people. This result supports that a measure of global intelligence (e.g., FSIQ) is not the best criterion to select gifted individuals and that there are different domains in which one could obtain scores in the gifted range. Moreover, scholars and clinicians should always consider that the WAIS-IV measures only four or five intellectual abilities and overlooks others, such as auditory processing (*Ga*), retrieval fluency (*Gr*), or learning efficiency (*Gl*). Thus, I propose not to use rigid cut-offs to identify intellectual giftedness, giving more importance to the individual pattern of performance across different abilities whom intelligence test is made up of. However, when psychologists base their consideration on the WAIS-IV scores to assess intellectual giftedness, I strongly recommend interpreting the performance on perceptual reasoning tasks because it might indicate an overall cognitive functioning above the average. These measures have also a low degree of cultural loadings and linguistic demand (Flanagan et al., 2013); the use of PRI would make intellectual giftedness useful during the psychological assessment of multicultural individuals and/or with low level of education. Additional researches should examine which cognitive domains may be relevant indicators of giftedness. For example, individuals who obtain 130 on VCI might be considered differently from who scores 130 on PSI because verbal knowledge may give more benefits in ordinary life than processing speed may do. However, other important variables should be considered when assessing cognitive performances, such as background factors (e.g., level of education and gender) (Holdnack & Weiss, 2013), noncognitive abilities (e.g., socio-emotional qualities, aptitudes and beliefs), learning styles, temperament and personality characteristics (Lang, Michelotti, & Bardelli, 2015; Lipnevich & Roberts, 2012; Mourgues, Hein, Tan, Diffley, & Grigorenko, 2016).

Also, the use of visuo-perceptual reasoning tasks allows recognizing gifted people who do not necessarily work in high-level positions. The term “underachievers” has been often referred to students with large discrepancies between standardized test score and actual scholastic achievements (Reis & McCoach, 2000). These students have specific needs which should be supported to allow them to express their intellectual strengths. I suggest that “underachievers” could be also employed to describe bright adults whose high intellectual abilities has never been identified. In line with Amend and Peters (2012), I think that “well-meaning professionals—with limited or no knowledge about gifted individuals—do not have a framework from which to view the behaviors of gifted children as ‘typical’ for them, thus resulting in misinterpretation” (p. 586). Intelligence tests are generally administered in adulthood when individuals may have intellectual disability or initial stages of dementia. However, the identification of high intellectual abilities is also important in adulthood because it “may contribute to make a more appropriate psycho(patho)logical diagnosis and job orientation” (Lang, Matta, Parolin, Morrone, & Pezzuti, 2017). The “disharmony hypothesis” links psychological disorders/impairments and giftedness (Heller, 2005). Preckel and colleagues (2015) proposed that giftedness can be a risk factor because of “inappropriate reactions in the social environment (e.g., teachers, peers, or society in general)

toward gifted, their developmental advances, and their unique intellectual and socioemotional needs" (p. 2). Thus, these variables could have made gifted adults more vulnerable in the individual development (Bailey, 2011; Peterson, 2009). When clinicians or psychotherapists work with a client who is gifted, they should be aware of influences between long-term maladjustments and psychological well-being.

In conclusion, additional researches are required to understand if analogous considerations might be generalized to people with other kinds of exceptional skills (e.g., creative reasoning, leadership, athletic aptitudes, and arts) or if intellectual abilities play an important role in the psychological functioning of other categories of the gifted group.

1.5 Inherent Limitations in Studying Cognitive Profile of Intellectually Gifted Adults

Research on intellectual giftedness is affected by several limitations, inherently related to the nature of this topic. First, since this phenomenon is rare (i.e., about 2% of the general population), the process of data collection takes a long time and it is difficult reaching an acceptable sample size. Clinicians and practitioners infrequently assess intellectual abilities of adult clients. On the contrary, studies on gifted children are easier because it is a common practice for schools administering IQ tests in order to provide special education to them. Additionally, as I already pointed out, women are under-represented both in the Italian and in the American literature. This imbalance may be explained by the higher presence of males at the extreme of the intelligence distribution (Deary et al., 2003), and for psychological, cultural, and sociological reasons.

The conception of giftedness itself represents another important limitation. Different scholars have adopted different criteria to define intellectual giftedness. Some have employed a single threshold (e.g., IQ score), whereas others have based the definition on multiple criteria, such as scholastic attainments, parent or teacher referrals, extra academic activities, or as the outcome of a general psychological assessment) (Carman, 2013). For instance, American gifted group was selected based on a measure of cognitive ability 2 DS above the mean, or among people who were a current member of Mensa *and* have received previous gifted education (Wechsler, 2008b). The use of a rigid cut-off to select gifted individuals is problematic because it does not consider what confidence intervals (C.I.) really are. Yet, intelligence test scores are always inaccurate because of the standard error of measurement (i.e., SEM). A "confidence interval" gives a range of values where examinee's true score is likely to fall (Urbina, 2014). For example, people who obtain an IQ score of 130 on the WAIS-IV have a 0.95 probability that they real IQ will be between 126 and 133. That means their true IQ may be lower than 2 DS above the mean (from 126 to 129). If practitioners and researchers want to identify individuals whose FSIQ is 130 at the 95% level of confidence need to select people who obtain an observed IQ score of at least 134 (95% C.I. = 130 – 137; Orsini & Pezzuti, 2013, p. 60). Similar considerations should be done for single broad Indexes. Consequentially, also people with an IQ score lower than 130 could have been included in the gifted sample (e.g., 95% C.I. for an IQ score of 126 is between 120 and 130). Thus, the criteria which I employed to identify gifted individuals in this study may be considered too weak or indulgent.

Lastly, in this first chapter, my aim was to examine the performance of intellectually gifted adults. However, I know that there are other ways to be considered gifted which I did not consider, such as individuals who exhibit an exceptional level of creativity, academic achievements, leadership skills and visual/performing arts. They may obtain different results, patterns of performance, and distribution of scatter measures.

CHAPTER 2. INTELLECTUAL GIFTEDNESS AND PERSONALITY

In 2009 a special issue of "Gifted Child Quarterly" was published to respond to nineteen common myths about gifted people. Several experts in this field wrote brief papers about naïve conceptions that could bias the practice of psychologists, teachers, and educators when they face gifted individuals. Two of the most common myths were that high ability individuals do not have unique social and emotional needs (Peterson, 2009) and that they are immune from life challenges and psychological difficulties (Moon, 2009). This conception comes from many papers where authors have shown that there was no difference in psychological adjustment between gifted individuals and their peers. Indeed, many scholars have been supporting that intellectual abilities above the average are protective factors that can prevent psychological disorders (Cross, Cassady, Dixon, & Adams, 2008; Gottfredson & Deary, 2004; Robertson, 2013; Terman, 1926).

This chapter aims to explore the characteristics of personality and emotion regulation dimensions of the gifted adults from a clinical perspective, which means that I will examine whether high intellectual abilities may predispose to specific psychological vulnerabilities and environmental maladjustments. Before going any further, I need to explain this more deeply. Although many journals focused on giftedness (e.g., *Gifted Child Quarterly*, *Journal for the Education of the Gifted*, *Roeper Review*, *High Ability Studies*, *Advanced Development*), it is rare to find articles where authors explain this phenomenon using a clinical psychology framework and well-validated personality measures (Martin et al., 2010). The overall impression is that giftedness may be not related to psychological functioning or it is not a relevant concept in the clinical practice. There are few exceptions in which scholars examined relationships between high intellectual abilities and models of personality (e.g., giftedness and MMPI, Cross et al., 2008; giftedness and Erikson's Theory of Psychosocial Development, Fiedler, 2012; giftedness and Five Factor Model, (McCrae et al., 2002; Zeidner & Shani-Zinovich, 2011), or described how superior cognitive abilities may change diagnostic criteria (e.g., giftedness and psychopathological diagnosis, Webb et al., 2016). However, these efforts cannot improve the knowledge about giftedness effectively because they are not systematic and they often do not use both theoretical framework and clinical tools.

In this chapter, the intellectual giftedness will be explored within the framework of the developmental psychology and psychopathology (Dante Cicchetti, 2016). This approach is based on empirical evidence, considering "how cognitive, behavioral, physiological, representational, and emotional systems may evolve over time, laying the foundation for features of maladaptive personality functioning in adulthood" (Geiger & Crick, 2010, p. 59). First, I will examine concepts of vulnerability and risk factor. Then I will introduce the Livesley's Dimensional Model of Personality Pathology and I will describe the self-report questionnaire (DAPP-BQ, Livesley & Jackson, 2009, ed.it. 2014) created to assess psychological functioning focusing on the severity of personality traits. Then I will present empirical data to discuss how gifted people's personality functioning can be different from average intelligent individuals. Finally, DERS (Difficulties in Emotion Regulation Scale, Gratz & Roemer, 2004) results will be compared between these two groups.

2.1 At the Right Extreme of the Normal Curve of the Intelligence

Traditionally, an IQ score equal to or greater than 130 was considered a marker of intellectual giftedness (Vaivre-Douret, 2011). Although there are many other definitions of gifted, the IQ is still

the most common criteria to assess and identify people with high intellectual abilities (Carman, 2013). Consistently with the first chapter, I will adopt the definition of intellectual giftedness based on the CHC Theory of Intelligence (Gridley et al., 2003). Let me recall that definition so it will be easier for the reader to follow this line. Intellectual gifted are individuals who "demonstrate (a) a high performance in general intellectual abilities and/or (b) an exceptional potential in specific intellectual abilities and/or (c) exceptional general or specific school attitudes" (Gridley et al., 2003, p. 290).

Now, the reader may not fully understand the reason why we need to study personality traits in gifted people. What should they be relevant for? To address this question, let's take a look at the opposite extreme of the normal curve of the intelligence. People affected by intellectual disability have not only different performances in cognitive tasks but also different manifestations of psychological disorders. For this reason, the American Psychiatric Association published the DM - ID 2 (Diagnostic Manual - Intellectual Disability 2, Fletcher, Barnhill, & Cooper, 2016), a parallel edition of the DSM 5, in order to increase the accuracy of psychopathological diagnosis in people with intellectual disabilities.

Intellectual disability and giftedness have some common characteristics: (a) intelligence test score plays an important role in diagnostic process; (b) they are both deviations from the expected norms; (c) different levels of intellectual functioning interact with biological maturation, intra- or interpersonal functioning, emotional competence, and social, occupational, and other important pursuits (Peebles, 1986). They often face unique challenges alone and struggle to adapt to their environment, especially in establishing good relationships with peers. People with intellectual disability could have unrewarding interactions with others since their limited vocabulary or their restricted interests; otherwise, gifted people could share same interests of other individuals but the specific nature of that interest could be different; for instance, "a gifted guy who have cultivated an interest in the latest collectible card game may find that their agemates enjoy the cool pictures and superpowers, but are not able to engage with the game at a strategic level" (Yermish, 2010, p. 68-69).

However, giftedness is rarely an element that clinicians consider during the psychological assessment (Amend & Beljan, 2009). They may not have received a specific training about the role of intellectual abilities may affect other psychological areas or they simply do not consider high intellectual abilities as a *real* risk factor. Of course, extremely high intellectual abilities do not increase the likelihood to develop psychological maladjustments *per se*, but also do not guarantee that gifted individuals will be immune from mental disorders.

Several issues could affect the psychological assessment of gifted individuals:

1. "Misdiagnosis". Intellectual abilities could be overlooked because clinicians can make a diagnosis based on explicit behavioral dysfunctions rather than on the overall psychological functioning. For instance, gifted individuals tend to prefer being alone rather than interacting with other people in the everyday environment. A clinician who is not aware of this evidence may look for depressive symptoms or avoidant traits of personality in order to explain his client's functioning (Adams-Byers, Whitsell, & Moon, 2004; Neihart, Reis, Robinson, & Moon, 2002). However, Shechtman and Silektor (2012) showed that students who were involved in a scholastic program for gifted were not more isolated than the others; hence, psychological assessment should also consider bidirectional interactions with different levels of environment.

2. “Twice-exceptionality”. In some cases, giftedness and psychopathological disorders could co-occur (e.g. ADHD, Antshel et al., 2009; Probst & Piechowski, 2012; or learning disabilities, Brody & Mills, 1997; Foley Nicpon, Allmon, Sieck, & Stinson, 2011): (a) intellectual abilities can mask relevant symptoms partially or completely; for instance, gifted individuals with bipolar disorder may be only aware of depressive phases because manic states tend to be associated with periods of high dynamism, enthusiasm, creativity, and no need for sleeping (Silverman, 2003); (b) psychopathological disorders can be so intense that intellectual giftedness cannot be noticed by others; for instance, a gifted student with a severe learning disability may achieve average results in school leading not to consider the presence of high intellectual abilities; (c) psychological disorders and giftedness could compensate one another; scholastic or job underachievement is the most common effect.
3. Finally, clinicians could identify giftedness correctly but they may not able to use one’s intellectual strengths during psychological treatment. Indeed, the brain of gifted individuals may make cognitive processes (such as perception, integration, and data interpretation) more efficient and more effective than individuals with intellectual abilities in the average range (Geake, 2008; Karpinski et al., 2017; Mrazik & Dombrowski, 2010; Sousa, 2009). These abilities may represent an important resource for individual adaptation strategies and overall psychological well-being (Prober, 2008).

So far, I have explained why it is important to assess the psychological functioning of gifted individuals and how high intellectual abilities may interfere and change diagnostic criteria. Before reviewing the specific literature about personality traits and emotion regulation in gifted people, I will explain some fundamental concepts of developmental psychology and psychopathology theoretical framework is required because they will be useful to discuss results of this study.

2.2 Developmental Psychology and Psychopathology

Development of personality disorders is influenced by interactions with many internal and external variables (e.g., temperament, attitudes, relationships with peers, parents and teachers, society, etc.). If negative feedbacks affect one or more relationships among different levels of the environment, maladaptive patterns can occur. These problems can be temporary or so persistent that they will constitute specific vulnerabilities for future psychological maladjustments.

Developmental psychopathology represents a framework to explain personality disorders and psychological maladjustments in terms of vulnerabilities and risk factors across different ages (Achenbach, 1974; Cicchetti, 2016; Sroufe & Rutter, 1984). These features refer to different domains, including cognition, biology, social, emotional interaction. Although the relationships between these processes in childhood and the development of personality disorders in adulthood have not been completely explained yet, this approach seems to be clinically fruitful in orienting clinicians’ attention to collect important elements in the diagnostic process and psychological treatment.

The framework of developmental psychology and psychopathology consists of five fundamental principles:

1. Development of normal or maladaptive personality is influenced by interactions across cognitive, biological, social and emotional processes over time (Cicchetti & Curtis, 2006).

2. Specific adaptation patterns are required to solve significant tasks at certain ages (e.g. attachment relationship with the caregiver during the first years of life).
3. Developmental outcomes are the consequences of equifinality and multifinality processes; they connect protective and risk factors to maladaptive and adaptive results. Equifinality refers to the process for which different pathways might result in the same outcome; otherwise, multifinality means that specific risk factors may result in many different developmental outcomes (Cicchetti & Rogosch, 1996).
4. Pathological adjustments are conceptualized as deviations from adaptive and typical behavior patterns.
5. Failures in specific developmental tasks do not necessarily determine psychological disorders but they could increase risks for maladaptive behaviors. When individuals adapt themselves to these deviant pathways, it could become more difficult (in terms of time and efforts) to come back to a typical progression. The change may be still possible but it will be constrained by the individual history and current overall environment (Sroufe, 1997).

The use of this theoretical framework has two relevant implications: first, psychological assessment is focused on broader clinical constructs rather than categorical disorders (e.g., hostile world view vs. paranoid disorder) (Costello, 1996; Geiger & Crick, 2010); second, biological, psychological and social vulnerabilities during childhood are related to personality disorders in adulthood (Cicchetti, 2016; Geiger & Crick, 2010). Thus, this approach describes central challenges and behaviors at a specific age, preferring the dimensional diagnostic system to traditional psychiatric categories (van Praag, 1996, p. 131). Dimensional systems are centered on "common themes" which refer to the continuum of behaviors or characteristics. For instance, impulsivity may be described from a lack of reflectiveness and planning on one side and meticulousness and fussiness on the other extreme.

2.2.1 Vulnerability and Risk

Vulnerabilities and risk factors are related but they are not interchangeable. These terms refer to different aspects of the development of psychological disorders (Cicchetti, 2016; Ingram & Price, 2010). Risk factors are typically descriptive variables that increase the likelihood of dysfunctional traits; however, they do not represent a causal mechanism that generates specific disorders and they may be also present in the external environment (e.g., poverty, or stress). Taking an extreme position, Albee (2000) stated that any treatment cannot be effective if external variables are still active because it would be like "use a band-aid to stop a hemorrhage" (Ingram & Price, 2010, p. 11). On the other hand, vulnerability describes mechanisms that contribute causally to the onset or preservation of psychopathologies. Beyond that, there is a general disagreement on the definition of "vulnerability". However, this concept implies three core features:

1. **Stable trait**: vulnerability endures over time and increases the likelihood to develop psychological disorders but it does not match the disorder completely. To be clearer, vulnerability as a permanent trait is different from a psychological state: the latter represents a set of symptoms that can occur for a limited amount of time in one's life. Indeed, altered states can be present or absent, whereas vulnerabilities are constant. This does not mean that they are not alterable. This is particularly true for *psychological* vulnerabilities; for instance, Hollon, Stewart, and Strunk (2006) have reviewed different data about the efficacy of cognitive therapy and they concluded that pharmacological

interventions tend to suppress symptoms and promote short-term changes, whereas psychological treatments tend to offer corrective experiences which in turn can reduce vulnerabilities to particular disorders. Therefore, this theoretical framework makes a new distinction between "stability" and "permanence". Psychological processes may be stable and they could change under positive circumstances (e.g. psychotherapy or other significant experiences); other variables (e.g., genetic influences or prenatal processes) may be permanent.

2. **Endogenous variable**: vulnerability is placed within individuals and it is not "external" (e.g., present in the environment) (Joiner & Coyne, 1999). This might be the most explicative feature that separates vulnerability from risk factors. Since vulnerability is not observable, it may be latent or endogenous. Researchers have shown great interests to find empirical markers of these underlying processes.

3. **Role of stress**: even though stress might not be conceptualized as a "feature" of vulnerability, it represents an important variable strictly related to that. Ingram and Price (2010) defined stress as "life event (major or minor) that disrupts the mechanisms maintaining the stability of an individual's physiology, emotions, and cognitions" (p. 9). Therefore, the perception of stressful events can trigger the onset of psychological disorders, acting on individual vulnerabilities.

2.2.2 Vulnerability in Adulthood

Although most vulnerability factors occur in childhood or adolescence, the re-actualization of these processes and the onset of the psychopathology often happen in adulthood. The Diathesis-stress Model may be helpful to examine how stress and vulnerabilities interact with one another. Indeed, "diathesis" refers to the predisposition to develop diseases and it focuses both on biological variables and psychological factors (such as cognitive, or interpersonal weaknesses). Stress may act on these variables and trigger psychopathological disorders; results are effects of the interaction between vulnerability processes (endogenous and latent) and stressful events. Thus, the variables involved in this process may influence people from this stage of life.

Also, some vulnerabilities might develop in adulthood. Even though most of them occur in childhood, new negative learning experiences may happen later. For instance, anxiety disorders can be the consequence of negative circumstances if adult individuals are exposed to them for a certain amount of time or level of intensity. Post-Traumatic Stress Disorder (PTSD) represents a good example of vulnerabilities shaped in adulthood (Reese, Najmi, & McNally, 2010; Young, 1995). Although negative experiences are more likely to cause psychopathological disorders in childhood, even though they can contribute to creating new vulnerabilities also in adulthood.

I pointed out in the previous paragraph, vulnerability processes create permanent and stable dysfunctional personality traits in adulthood. However, changes can also be related to positive results, preventing that psychopathologies can occur again. These changes depend on the kind of psychopathology and which level of vulnerability is involved (e.g., biological or psychological). New experiences (e.g., psychotherapy) can offer better adaptive learnings (Ingram, Miranda, & Segal, 1998; Mahoney, 2000). Although these experiences may not remove individual vulnerabilities, changes are possible and something that originated in childhood may be modified later.

So far, I reviewed theoretical approach to the developmental psychology and psychopathology. I showed that vulnerability and risk are two different concepts and I revised the multicomposite definition of the term "vulnerability". Finally, I stressed the role of vulnerabilities in childhood and in adulthood. Next paragraphs will focus on personality assessment, providing a link between these theoretical constructs and the clinical practice.

2.3 Personality Traits Assessment

2.3.1 Categorical vs. Dimensional Models

Personality evaluation has always been a controversial topic in clinical psychology. The lack of agreement around the definition of "personality" is one of the main issues in this field. Indeed, personality can be examined using categories or dimensions. DSM-5 (APA, 2013) or ICD-11 (WHO, 2018) are based on a categorical approach which considers psychopathologies as discreet entities made of presence or absence of particular conditions (or *symptoms*); by contrast, dimensional approaches are usually based on theoretical models created by specific authors (such as (Livesley & Jackson, 2009; Millon & Grossman, 2015; Morey, 2007) and the personality consists of a set of dimensional maladaptive traits.

Categorical classifications of personality disorders tend to represent obstacles for psychologists and scholars. Problems often involve low reliability of the assessment procedures; same labels for different sets of psychopathological characteristics; limited empirical evidence for certain personality disorders (Krischer, Sevecke, Lehmkuhl, & Pukrop, 2007). Westen and Arkowitz-Westen (1998) reported that about 60% of the clients with personality disorders did not match with any personality disorders. Thus, they can be undiagnosed or over-diagnosed (i.e., comorbidity rate up to 80% of the clients in some samples, Oldham et al., 1992). Moreover, normal and pathological personalities are separated by an arbitrary cut-off based on the number of symptoms. Finally, some aspects of personality tend to be overlooked (Geiger & Crick, 2010); for example, sensation seeking (i.e., "strong need for varied, novel, and stimulated experiences, and willingness to take risks for the sake of such experiences"; Zuckerman & Neeb, 1979) and impulsivity (i.e., "lack of reflectiveness and planning, rapid decision-making and action, and carelessness"; Schalling, 1978) are important dimensions for personality assessment. However, these traits are rarely considered in categorical systems, while they may represent core features of certain disorders (e.g., antisocial or borderline personality disorder or substance-related disorders).

Differently, dimensional approaches to personality disorders are more appropriate to explain empirical data and they are more valid than categorical models (Trull & Durrett, 2005). These models have been so supported by empirical studies and psychopathology literature that the authors of the DSM-5 have proposed an alternative model for assessing personality disorders (PD) (Anderson, Snider, Sellbom, Krueger, & Hopwood, 2014). This model assesses PD along two criteria: (a) functional impairment or (b) dimensional personality traits. The first criterion refers to specific issues in the domain of the Self (Identity or Self-Direction) and Interpersonal (Empathy or Intimacy) functioning (Table 2.1). The second criterion considers maladaptive personality traits in five dimensional domains (i.e., Antagonism, Psychoticism, Disinhibition, Negative Affectivity, and Detachment). They showed strong empirical validity (Samuel & Widiger, 2008; Widiger & Simonsen, 2005) and a good convergent validity with other models, such as the five-factor model (FFM) (Gore & Widiger, 2013) and the Personality Psychopathology Five (PSY-5) (Anderson et al., 2013).

Table 2.1 Elements of personality functioning considered in Section III of the DSM-5.

Self	*Identity*	Experience of oneself as unique, with clear boundaries between self and others; stability of self-esteem and accuracy of self-appraisal; capacity for, and ability to regulate, a range of emotional experience.
	Self-direction	Pursuit of coherent and meaningful short-term and life goals; utilization of constructive and prosocial internal standards of behavior; ability to self-reflect productively.
Interpersonal	*Empathy*	Comprehension and appreciation of others' experiences and motivations; tolerance of differing perspectives; understanding the effects of one's own behavior on others.
	Intimacy	Depth and duration of connection with others; desire and capacity for closeness; mutuality of regard reflected in interpersonal behavior.

Note. Reprinted from *Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5)* (APA, 2013, p. 762). Copyright © 2013 American Psychiatric Association.

Although dimensional models improve assessment of PD, they still have some limitations: a) lack of an evolutionary framework, and b) no clear distinction between psychological disorders and non-disorders. Extreme manifestations of one single trait are not generally considered adequate markers of psychological disorders (Wakefield, 2006). The degree of maladaptivity has been extensively used to define PD; however, this term refers to interpersonal maladjustments, and thus it is related to cultural values which in turn cannot be suggested as universal criteria of psychopathological dysfunctions. Indeed, PD are not defined by a single trait but they depend on how all personality traits and sub-traits interact with one another and with relevant aspects of social context (Allport, 1961). Every human being may have one or more dysfunctional traits and he/she may never develop a personality disorder. For this reason, Wakefield (1992a, 1992b) has defined mental disorders as "harmful dysfunction" and suggested that psychological or behavioral maladjustments should meet two criteria: a) they are detrimental or painful based on cultural values; and b) they are determined by a failure in one or more life tasks which are evolutionarily shaped.

Yet, models of personality should examine processes and dynamics in order to identify principles about how traits are integrated into general psychological functioning. Personality may be the vehicle to fulfill interpersonal regulation among different people according to the cultural background. This may help to define roles in a society. However, the "goodness of fit" to the culture cannot be considered a reliable indicator of PD for at least three reasons: a) healthy personality should not be equivalent to cultural conformity; b) culture could require adjustments that only few healthy individuals can accomplish; c) personality cannot be changed completely by cultural values. Since personality is the product of evolutionary processes, some disorders may also represent an opportunity to maintain a certain degree of diversity within a society. Thus, emphasis on cultural values leads to consider their *causal* role on personality, and on the complex pathway to the development of psychological dysfunctions (Wakefield, 2006).

2.3.2 Assessing Severity of Personality Traits

Assessment of PD usually aims to identify one or more psychopathological categories that match set of patient's symptoms. This idea is basically wrong since psychological traits are dimensional (Clarkin & Livesley, 2016). In such a perspective, the severity of PD represents a core feature of psychological assessment. However, the concept of "severity" is still vague. Several measures have been proposed in literature but there is large disagreement. One common contribution comes from

Tyrer and Johnson (1996), who suggested to conceptualize severity as a function of the sum of all psychopathological criteria observed in one's personality. A similar approach was used by Dimaggio and colleagues (2013). Thus, if a client meets criteria for one disorder is considered less severe than clients that may meet criteria for multiple disorders. Although this method may be valid, severity should be separated from psychopathological categories. Severity could also reflect the degree of personal and interpersonal impairment and not only the sum of criteria. For instance, Bornstein (1998) suggested some specific dysfunctions which may be particularly informative (i.e., distorted cognition, inappropriate affectivity, interpersonal impairment and impulse decontrol). Hopwood and colleagues (2011) suggested to integrate these two approaches and consider also the relationships with normative traits. Finally, the difference between "severity of pathology" and "intensity of distress" should be considered (Clarkin & Livesley, 2016); indeed, some personality disorders could cause little distress but severe impairment (e.g., avoidant or schizoid personality disorder), whereas other disorders may elicit strong emotional feelings with relative low severity.

Livesley (2011) has suggested another method to assess severity. Self and interpersonal functioning are two important domains that indicate how much dysfunctional traits affect one's life. Impairments in Self functioning affect:

a. Differentiation (i.e., difficulties in attributing personal qualities and feelings). People who have poorly differentiated Self struggle to answer questions about who they are; generally, they present themselves describing few concrete characteristics. Thin boundaries between self and others may increase experiences of "inner emptiness".

b. Integration (i.e., unstable sense of Self and difficulties in perceiving a sense of unity and continuity). People who have poorly integrated Self have ideas about themselves that frequently can change. When particular emotional states are experienced, valence of feelings and thoughts may be rigid and persistent.

c. Self-directedness (i.e., difficulties in identifying and reaching personal goals). This is the motivational component of the Self and it consists of self-efficacy (i.e., feelings about the control of own or other's destiny), the meaning of life, and setting of long-term life goals.

Impairments in interpersonal functioning can affect:

a. Intimacy and attachment (i.e., difficulties in establishing close relationships with both peers and life partner). People who have poor intimacy may have problems both in quantity and quality (i.e., few friends and unstable relationships).

b. Prosocial behavior (i.e., difficulties in socialization and/or in moral development). This refers to cooperative behaviors to reach a common goal.

Based on these domains, severity can be conceptualized into 4 levels that go from adaptive personality to clinically significant dysfunctions (see Table 2.2). Each level describes different personality functioning: the more the impairment is severe, the more it will predispose to or perpetuate another mental disorder, or maintain occupational, and/or relational functioning.

Table 2.2 Overview of Levels of Personality Functioning

Level	Self	Interpersonal	Trait Expression
1a. Adaptive Functioning	Adaptive	Adaptive	Normal and Adaptive Range
1b. Adaptive Functioning	Adaptive	Adaptive	High level on one or more traits (no clinical relevant)
2. Personality Dysfunction	Adaptive	Adaptive	High level on one or more traits (clinically relevant)
3. Personality Disorder	Impaired	Impaired	Extreme level on one or more traits
4. Severe Disorder	Largely Impaired	Largely Impaired	Extreme level on one or more traits

Note: At levels 3 and 4, impairment of one broad domain of functioning (i.e., self and/or interpersonal) may be sufficient to diagnose psychopathological disorders.

2.3.3 Dimensional Assessment of Personality Pathology-Basic Questionnaire (DAPP-BQ)

There are several measures to assess personality functioning and severity in adulthood (Clark & Harrison, 2001). Livesley (2009, 2011) created a model to evaluate systematically multiple dimensions of personality disorders since psychopathological categories have several limits. The myth of homogeneous categories (i.e., a certain number of criteria associated with one specific disorder) affects not only the diagnostic process but also psychological treatments (Blashfield, 1984). Diagnoses based on categorical system tend to reify disorders rather than describe them as the effect of the relationships within personality traits and the complex interaction with the multiple levels of the environment.

Livesley defined personality disorders as *adaptive failures* to achieve solutions to universal life tasks. There are three main domains where psychopathological issues can show up: (a) in building stable and coherent representation of self and of the others; (b) in establishing a sense of intimacy, affiliation, and attachment; (c) in functioning within the social group (i.e., cooperative relationships, and prosocial behavior). This definition is based on some assumptions. First, maladaptive personality traits are dimensions on which one extreme side is represented by personality dysfunctions, whereas the other side consists of optimal intra- and interpersonal adaption. Second, Livesley defines "normal personality" as a set of traits that are not directly observable. These dimensions are relatively stable and permanent, and they are represented on a continuum. The more the individual has severe personality traits, the more he/she will act in line with that trait. When "normal personality" is defined as the absence of psychopathological symptoms, diagnostic mistakes may increase because criteria tend to be less observable. Third, personality disorders are different from "personality dysfunctions". Personality is the result of the interaction of multiple traits. Impairments in specific components do not cause necessarily a severe psychological damage or they may create occasional difficulties that most people have to face every day. For instance, if an individual is extremely shy, this single trait may not have a great impact on general life but it may cause discomfort in some social situations (Wakefield, 2008). Livesley (2009) created a self-report questionnaire (i.e., Dimensional Assessment of Personality Pathology-Basic Questionnaire – DAPP-BQ) in order to assess psychopathological personality traits consistent with his theoretical model. These constructs were chosen from the clinical literature on personality (Livesley & Larstone, 2008). It consists of 18 primary and 4 secondary traits (Table 2.3), whose impairments could increase the likelihood to develop personality disorders.

Table 2.3 DAPP-BQ scales and Cluster: definition of primary and secondary traits.

Emotional Dysregulation	*Affective Lability*	Rapid emotional changes; feelings and emotions can rise quickly and become intense shortly.
	Anxiousness	Persistent feelings of fear, tension, and guilt; decisions can represent difficult challenges because of fear of failure or terror to make mistakes.
	Cognitive Dysregulation	Stressful events can easily disorganize thoughts and emotions; unusual perceptions and experiences can occur (e.g., depersonalizations or derealizations).
	Identity Problems	Instability of Self-Identity and pervasive feelings of boredom and emptiness; lack of self-confidence and negative beliefs about the future. Pessimist view of events and experiences.
	Insecure Attachment	Fears and worries of being separated from significant others; persistent need of others when facing stressful events; strong efforts to avoid being alone (e.g., protests).
	Oppositionality	Passive efforts to resist cooperating with others and satisfying their expectations and requests, even in basic routine activities; typically, low levels of planning and taking initiatives.
	Submissiveness	Constant needs of advice and reassurances about actions or decisions; preference for abuse and humiliating relationships rather than being alone.
Dissocial Behavior	*Callousness*	Lack of consideration for others' needs and feelings; lack of empathy or remorse. Others are easily manipulated and they are useful essentially just for own purposes.
	Conduct Problems	Antisocial behaviors and lack of considerations of social norms and rules; presence of strong anger can result in physical violence. Tendency to engage in substance misuse.
	Narcissism	Strong need for admiration, approvals, and attentions; fantasies of unlimited beauty, power, and success.
	Rejection	Hostility to others and preference to take control and dominate them; rigid cognitive style and expectations and fear to challenge others.
	Stimulus Seeking	Sensation seeking and impulsivity; intolerance to normal or routine and acting without planning or considering consequences of his/her actions; difficulty to learn from experiences.
Social avoidance	*Intimacy Problems*	Lack of interest and/or fear of intimacy; separations or reunions cause little reactions; limited pleasure from sexual relationships.
	Low Affiliation	Lack of interest in socializing with other people and social detachment; often lack of social and conversational skills.
	Restricted Expression	Restricted expressions of all emotions and avoidance self-disclosure and in revealing personal details. Rarely they seek help from others.
Compulsiveness	*Compulsivity*	Tendency to complete tasks with precision and meticulousness; need for structure, order, and precision; love for time, punctuality, and rules; strong sense of responsibility and duty.
Other	*Self-harm*	Frequent suicidal thoughts or behaviors (e.g., self-mutilations or drug overdoses).
	Suspiciousness	Hyperalert to others' signs that would confirm hidden meanings of their actions; feelings of persecution.

According to Livesley's dimensional model, the diagnostic process of personality aims to describe the complexity of psychological processes. The system is flexible and client-tailored because individual differences become the focus of the clinical practice; in fact, categorical classifications are replaced by assessing and describing areas of dysfunctions and patterns of impairments. When interpreting personality functioning, primary traits are grouped into domains or clusters based on genetic analyses (Hernández et al., 2009). These clusters are the main areas to describe personality functioning, including psychological strengths and weaknesses.

So far, I have reviewed two main approaches to personality assessment (categorical vs. dimensional) and I have examined diagnostic improvements associated with the conception of personality as a set of traits that can change on a continuum. I considered Livesley's model one of the most representative theoretical frameworks in the literature of clinical psychology. His conception of PD as "adaptive failure" is particularly useful to interpret psychological functioning which is not necessarily related to disorders. Since the focus of this chapter is to describe personality traits and vulnerabilities of people with extremely high IQ, I will review empirical literature on emotional and personality functioning of gifted individuals.

2.4 Empirical Research on Intellectual Giftedness[7]

2.4.1 Historical Introduction: Terman vs. Hollingworth

Although giftedness has been examined since the beginning of the last century, the relationship between high intelligence, psychological adjustment, and personality is still not clear (Gross, 2006). Lombroso (1891) suggested that high intelligence was related to psychological maladjustments. This negative view was contested by Lewis Terman who conducted extensive longitudinal studies between 1925 and 1959, supporting that gifted students tended to be more adjusted to their environment than their peers. His definition of intellectual giftedness was based on the Stanford-Binet test score (i.e., IQ ≥ 140). His findings have been confirmed by several other studies (Kelly & Colangelo, 1984; Lee, Olszewski-Kubilius, & Thomson, 2012; Nail & Evans, 1997; Preuss & Dubow, 2004; Riaz, Shahzad, Ahmad, & Khanam, 2013). During the same years of Terman's work, Leta Hollingworth (1942) presented opposite evidence, supporting that gifted children had higher risk to develop psychological issue than average-intelligence people. Similar negative outcomes have been confirmed by other scholars (Dauber & Benbow, 1990; Eklund, Tanner, Stoll, & Anway, 2015; Shaywitz et al., 2001). These two opposite views are still present in the giftedness literature. Taken to their logical consequences, each view leads to a different conclusion: Terman tradition has brought to consider a positive relationship between high intelligence and emotional and relational development; on the other side, Hollingworth tradition supports a negative correlation between them.

Two possible explanations have been suggested to explain this divergence. First, the relationship between psychological adjustment and intelligence is curvilinear and it changes from positive to negative in the gifted range. Few articles supported this hypothesis (Geake & Gross, 2008; Grossberg & Cornell, 1988; Wigtil & Henriques, 2015); however, it is still not clear the threshold after which gifted individuals may be at higher risk. Second, some authors stated that Terman's and Hollingworth's work were not so conflicting as they have been reported (Grossberg & Cornell,

[7] Preliminary results of this study were presented at the XVIII National Congress of the Association of Italian Psychology (Clinical and Dynamic Section); September 16-18, 2016; Rome, IT. The abstract of the poster was published as: Lang, M., & Matta, M. (2016). Personality Functioning in a Sample of Italian Gifted Adults. *Mediterranean Journal of Clinical Psychology, 4*(SB1), 114-115.

1988). Although Terman found positive associations between gifted individuals and psychological adjustment, he also reported similar outcomes to Hollingworth's for children with extremely high IQ. Yet, he distinguished between personal preference for "solitude", which may characterize most gifted individuals, and "loneliness", which would be the consequence of peer rejection or the lack of a social group. About the functioning of highly gifted children, Hollingworth (1942) wrote that they tend to "play little with other children unless special conditions such as those found in a special class for the gifted are provided. They have great difficulty in finding playmates in the ordinary course of events who are congenial both in size and in mental ability. Thus, they are thrown back upon themselves to work out forms of solitary intellectual play" (p. 262). Terman and colleagues recognized that "the children in [their] gifted group whose IQs are over 180 tend to fall into the social pattern described by Hollingworth" (Burks, Jensen, & Terman, 1930, pp. 173-174). He stated that they may struggle to find new friends at school and educators and teachers should identify their high intellectual functioning as early as possible to provide special opportunities to socialize with other gifted children.

2.4.2 Recent Studies on Intellectual Giftedness

Several studies have examined the psychological functioning of gifted individuals in the last decades. Some authors supported the idea that intellectual giftedness is not related with specific psychological traits (Cross et al., 2008; Jarosewich & Stocking, 2003; Thomas, Ray, & Moon, 2007) by contrast, other scholars showed that people with high intellectual abilities have specific vulnerabilities which may increase the likelihood of psychological maladjustments (Blaas, 2014; Dauber & Benbow, 1990; Shamosh & Gray, 2007; Zeidner & Shani-Zinovich, 2015). The harmony hypothesis and the disharmony hypothesis have been proposed to explain whether intellectual giftedness is associated with positive or negative emotional and social outcomes (Bergold, Wirthwein, Rost, & Steinmayr, 2015). The harmony hypothesis supports that higher intellectual abilities represent a protective factor and may promote more adaptive personality traits and greater life satisfaction (Bessou et al., 1983; Mueller, 2009; Zeidner & Shani-Zinovich, 2011). According to this hypothesis, gifted people tend to exhibit not only superior cognitive performances but also are more successful and more socially competent than their average-intelligence peers (Plucker & Callahan, 2008). Other studies that have supported this hypothesis have found no differences between gifted and non-gifted group, suggesting that intellectual giftedness is not a risk factor (Bergold et al., 2015; Cross et al., 2008). Differently, the disharmony hypothesis states that intellectually gifted individuals could have higher risks to develop psychological disorders or maladjustments (Cross, Coleman, & Terhaar-Yonkers, 2014; Cross et al., 2007; MacCabe et al., 2010). Although few authors have explicitly talked about giftedness as a risk factor for some psychological dysfunctions (Neihart, 1999, 2002), others have pointed out unique social and emotional needs of gifted individuals (Chen & Wong, 2013; Colangelo & Wood, 2015; Peterson, 2009). An updated version of the disharmony hypothesis suggests that inappropriate responses from the social environment (e.g., peers, teachers, parents, society in general), rather than giftedness *per se*, may increase psychological vulnerabilities (Preckel et al., 2015).

In general, gifted individuals are identified during childhood or adolescence, when their achievements and behaviors are significantly different from their peers. It is less common to be identified as gifted in adulthood because intelligence tests are administered rarely at this stage of life. Adults may be interested to examine their intellectual functioning if they reach important achievements or if well-trained psychologists consider that could be an important characteristic in one's overall functioning during the psychological assessment. However, characteristics related to high intellectual abilities (both cognitive and affective) can contribute to accomplishing new

successes in adulthood or may lead to developing specific psychological issues (e.g., isolation, boredom, or sense of dissatisfaction) which are often unrecognized. They may feel alone and misunderstood if they do not have other people that share similar traits. Emotionality and intensity are often reported as important domains in gifted individuals' life (Karpinski et al., 2017) and may be productive if expressed in arts or other creative areas. Otherwise, high intellectual abilities may represent an obstacle to attain academic achievements.

A systematic review of the literature on psychological functioning and giftedness is summarized within the following tables. Each table includes empirical studies, depending on whether gifted individuals showed better (Table 2.4) or worse (Table 2.5) outcomes than average-intelligence people, or no difference (Table 2.6). One clarification about selection criteria of the following articles. Exclusion criteria were: single case studies; indirect measures of psychological adjustment (such as life satisfactions, such as job position, income, marital satisfaction, numbers of published papers, doctoral degree, etc.); gifted group composed of people who did not exhibit high scores on intelligence tests or extraordinary scholastic performances; lack of a control group of average-intelligence individuals; published before 1980.

The first thing that stands out from the three tables is that empirical studies have found opposite results about the relationship between intellectual giftedness and psychological functioning. Recently two extensive reviews of the literature have been published (Francis et al., 2016; Martin et al., 2010). The aim was to define a clear view of the phenomenon. Their answer was that giftedness does not increase the likelihood to develop psychological issues (Baudson, 2016). They found that intellectually gifted children are socially better adjusted (Lee et al., 2012; Riaz et al., 2013) and show fewer internalizing and behavioral difficulties than their peers (Bracken & Brown, 2006; Merrell & Gill, 1994). Moreover, gifted individuals tend to have lower levels of anxiety (Scholwinski & Reynolds, 1985) and depression (Mueller, 2009) than average-intelligence people and a similar level of suicidal ideation (Baker, 1995; Metha & McWhirter, 1997). Regarding personality characteristics, gifted adolescents obtained similar results to their peers; small or moderate differences were often in favor of the gifted group (Cross et al., 2008; Zeidner & Shani-Zinovich, 2011). Many other empirical studies have examined gifted individuals, measuring self-concept and psychological well-being (Bergold et al., 2015; Jones, 2014). Again, these studies found trivial or small differences. Some scholars argued that gifted girls may be at higher risk of developing psychological maladjustments than boys (Reis, 2004), and they might experience a lower life satisfaction. However, these conclusions are based on weak and inconsistent empirical evidence.

On the other side, there are sparse but consistent studies that support an opposite view of the phenomenon (Cross et al., 2007; Eklund et al., 2015; Peterson et al., 2009). According to the disharmony hypothesis, gifted individuals are presented as more vulnerable to behavioral difficulties and emotional maladjustments. Asynchronous development has been often considered one of the main reasons for developing such negative outcomes (Gross, 2006; Neihart, 2002; Silverman, 1997, 2013). The asynchrony may increase with higher intellectual abilities and "the uniqueness of the gifted renders them particularly vulnerable" (Columbus Group, 1991); the greater the asynchrony among cognitive, affective and physical development, the more "out-of-sync" gifted individuals may feel (Dauber & Benbow, 1990; Zeidner & Zinovich, 2015). About personality traits, gifted individuals were also described as socially isolated (Cross et al., 2007) and with difficulties in fitting their social environments (Grobman, 2006; Robinson, 2008).

Table 2.4 Intellectual giftedness and positive outcomes.

Outcomes assessed	Citation	Definition of giftedness	Gifted sample description	Results
Adjustment	Riaz et al., 2013	RIAS IQ ≥ 130	93 (43 males); 13.7 ± 1.05 years	Higher level of psychological well-being and lower psychological adjustment problems
Anxiety	Scholwinski & Reynolds, 1985	Stanford Binet or WISC IQ ≥ 130	584 (259 males); Age range: 7-18 years	Lower levels of anxiety in all measured domains (i.e., Physiological, Worry/Oversensitivity, Concentration, and Lie)
Coping strategies	Preuss & Dubow, 2004	Enrollment in gifted program	52 (29 males); Age range: 11-12 years	Gifted children use problem-solving strategies more effectively than typical children; in addition, teachers report better academic and social adjustments
Depressive Symptoms	Mueller, 2009	Top 5% of scores on the AHPV Test	762 (401 males); 15.7 ± 1.65 years	Gifted students are less depressed than general population
Emotional Symptoms	Nail & Evans, 1997	Enrollment in gifted program (criteria: IQ ≥ 128 and achievement scores ≥ 90th percentile)	115 (55 males); Age range: 14-18 years	Significant lower scores in behavioral and emotional maladjustments
Life Satisfaction	Bessou et al., 1983	Mensa members	28 (gender not specified); Age range: 65-83 years	Higher levels of life satisfaction (about past, present, and future)
Overexcitability[a]	Wirthwein, Becker, Loehr, & Rost, 2011	IQ ≥ 130 in childhood and IQ ≥ 125 in adolescence	95 (53 males); Age range: 30-31 years	Higher scores on intellectual overexcitability scale
Personality	Zeidner & Shani-Zinovich, 2011	Students in Israeli gifted program	374 (232 males); 15.9 ± 0.82 years	Higher scores in Openness to Experiences and lower in Neuroticism
Self-perception	Perrone, Perrone, Ksiazak, Wright, & Jackson, 2007	Academically high achieving students	87 (33 males); Age range: 34-36 years	Positive conception to be gifted for the majority of the sample (e.g., higher self-confidence and self-awareness); however, negative beliefs in a small but consistent minority (e.g., pressure and embarrassment).
Social Competence	Lee et al., 2012	Academically gifted in math and science (based on admission criteria in their program)	740 (527 males); Age range: 12-18 years	Higher scores in interpersonal abilities and peer relationships. No negative effects in forming and maintaining friendships
Social Skills/ Antisocial Behavior	Merrell & Gill, 1994	Enrollment in gifted and talented program (criteria: WISC-R IQ ≥ 130 and an excellent performance in academic work or creative skills)	81 (45 males); Age range: 6-11 years	Higher levels of social competence and lower levels of antisocial behavior (but also small subgroup of gifted with poor social competences and problem behaviors)

[a] The literature is controversial about whether this result should be interpreted as a positive outcome (Karpinski et al., 2017; Rinn & Bishop, 2015).

Table 2.5 Intellectual giftedness and negative outcomes.

Outcomes assessed	Citation	Definition of giftedness	Gifted sample description	Results
Agreeableness	Zeidner & Shani-Zinovich, 2011	Students in Israeli gifted program	374 (232 males); 15.9 ± 0.82 years	Lower scores in the domain of agreeableness (e.g., kindness, cooperation, warmth, and consideration for others)
Behavioral Problem	Shaywitz et al., 2001	Enrollment in gifted program (WISC-R IQ ≥ 130, teachers' recommendation, parental input, and review by the school system)	35 males; 11.3 years	Level of behavior problems (e.g., impulsivity, negative affect, tractability) in a highly intellectually gifted (IQ ≥ 140) higher than the low intellectually gifted group (IQ = 130-139)
Bipolar Disorders	MacCabe et al., 2010	Excellent school performance at age 15-16 (language and math tests)	713596 (364839 males); 26.48 years[a]	Fourth time increased risk of later bipolar disorder compared with people with average grades.
Emotional Regulation	Shamosh & Gray, 2007	Scores on Raven's Advanced Progressive Matrices	50 (11 males); Age range: 18-23 years	More difficulties in emotional regulation because of depletion effect
Internalizing Behaviors	Eklund et al., 2015	Enrollment in gifted program	168 (94 males); Age range: 5-12 years	Among children demonstrating emotional and behavioral risks, higher levels of internalizing behaviors in gifted students as rated by parents (but opposite patterns from teachers' evaluations)
Leadership abilities	Antonakis et al., 2017	Scores on Wonderlic Personnel Test	379 (279 males); 38.34 ± 6.39 years	The relationship between perception of leadership and intelligence follows a curvilinear inverted-U function trend with the peak around an IQ score of about 120. After this threshold, leader abilities are evaluated more negatively
Overexcitability[b]	Miller, Silverman, & Falk, 1994	Mensa members, IQ ≥ 130, SAT combined ≥ 1200, or creative achievements in adulthood	41 (11 males); 37 years	Higher scores on emotional and intellectual overexcitability scales
Perfectionism	Dixon, Lapsley, & Hanchon, 2004	IQ test score, teachers' recommendation, individual interview	142 (51 males); 15.97 ± 0.41 years	42% of gifted scored in the maladaptive perfectionism range
Psychopathology	Karpinski et al., 2017	Mensa members	3715 (2213 males) 53 ± 15.18 years	High relative risk ratio of mood and anxiety disorders, ADHD, ASD, and physiological diseases (such as allergies, asthma, and autoimmune disease)

Self-concept	Zeidner & Shani-Zinovich, 2015	Students in Israeli gifted program	374 (232 males); 15.9 ± 0.82 years	Lower scores in physical, personal, and social self-concepts (but higher in the academic one)
Social Isolation	Cross et al., 2007	Academic test score (SAT), teachers' recommendation, individual interview	931 (407 males); adolescents	High likelihood to be introverted
Social Maladjustments	Dauber & Benbow, 1990	SAT-V ≥ 630 or SAT-M ≥ 700	300 (217 boys); 13.7 years	Higher self-report scores in introversion, and inhibition and less social skills. Perceived as less popular, less socially active, and less capable in leadership domain
Stigma/Identity	Cross et al., 2014	Residential summer program for most capable students	1465 (725 males); Age range: 14-18 years	High likelihood to see themselves as different from peers, to believe that these differences have negative social effects on them, and to use specific strategies to avoid that other students were aware of their giftedness
Stress perception	Peterson, Duncan, & Canady, 2009	Multiple criteria (not specified)	48 (21 males); Age range: 7-18 years	More stressful experiences related to achievements and peer relationships even when compared with other life events (e.g., trauma, dead in family, etc.)
Suicidality	Cassady & Cross, 2006	Academic test score (SAT), teachers' recommendation, individual interview	334 (148 males); adolescents	Structure of suicidal ideation for the gifted individual differs from average-intelligence group

[a] Longitudinal study based on Swedish National School and Hospital Discharge Registers. Mean follow-up time: 9.48 years.
[b] The literature is controversial about whether this result should be interpreted as a positive outcome or not (Karpinski et al., 2017; Rinn & Bishop, 2015).

Table 2.6 No differences in outcomes between intellectually gifted individuals and average-intelligence group.

Outcomes assessed	Citation	Definition of giftedness	Gifted sample description	Note
Depression & Suicide Ideation	Baker, 1995	SAT > 700 or academic achievement in the upper 5% of class ratings	90 (35 males); Age range: 12-18 years	No differences in level, severity, or nature of distress experienced
Life Satisfaction	Bergold et al., 2015	IST 2000 R Standardized Intelligence Score > 120	75 (56 males); 16.61 ± 0.72	No differences in life satisfaction (such as subjective well-being, including cognitive (i.e., life satisfaction) and emotional components (positive and negative affect)
Personality	Cross et al., 2008	Enrollment in program for academically gifted students	567 (247 males); Age range: 16-17 years	No abnormal level of psychological or personality deviance because of exceptional cognitive abilities. In some domains, scores moderately lower than average-intelligence students
Psycho-Social Adjustment	Rost & Czeschlik, 1994	Cattell's Culture Fair Intelligence Test IQ ≥ 120	50 (25 males); Age range: 10 years	No differences in anxiety level, social behavior, (therapy-relevant) behavior problems, and emotional stability, rated by different informants (children, parents, teachers)
Well-Being	Wirthwein & Rost, 2011	IQ ≥ 130 in childhood and IQ ≥ 125 in adolescence	101 (58 males); 28.4 ± 0.7 years	No difference in psychological well-being. Gifted rated "work" more relevant to their life satisfaction; otherwise, average-intelligence people preferred the domains of "self" and "friends"

In addition, gifted people may have higher likelihood to see themselves as different from their peers, to believe that high intellectual abilities may have negative social effects on them, and to use specific strategies to avoid that other students are aware of their giftedness (Cross, Coleman, & Terhaar-Yonkers, 2014).

In sum, there are many variables that may constitute risk factors for a good psychological development (e.g., asynchronous development, antagonism, isolation, social pressure to succeed, social stigma, etc.) but also many others that may represent protective factors (e.g., high intellectual abilities, coping strategies, openness, lower levels of antisocial behavior, etc.). The harmony and the disharmony hypotheses tend to prefer the association with a particular set of those variables. Based on these two conceptions, the view of giftedness may lead to stereotypical associations reducing the complexity of gifted individuals' functioning. Thus, "one gifted stereotype might entail the positive attributes specified in the harmony hypothesis, whereas the other gifted stereotype might consist of positive achievement-related and negative adjustment-related attributes specified in the disharmony hypothesis" (Preckel et al., 2015, p. 3).

Despite numerous attempts to find out if intellectual giftedness is a desirable trait for the overall psychological functioning, currently, there is no final answer. The reason why findings vary so greatly is also that several issues affect the literature in this field (Francis, Hawes, & Abbott, 2016). Thus, I will review some limitations that have been recognized.

1. Different criteria to identify intellectual giftedness (Carman, 2013; Ziegler & Raul, 2000). Many definitions of giftedness have been suggested and there is no agreement or dominant position. Although the use of intelligence measures (e.g., Wechsler scales) has been largely debated (Pfeiffer, Petscher, & Kumtepe, 2008), this is also the most common identification method that scholars tend to use in their studies. Carman (2013) has reviewed 104 articles about gifted students and she found that the IQ score was the only identification method used in more than half of studies. However, other identification methods have been adopted (e.g., achievement test scores, academic achievement grades, teachers' or parents' recommendations, extracurricular activities or counselors' recommendations). Ackerman (1997) stated that "one of the most critical problems in gifted identification stems from confusion in the field about what giftedness is and how it should be defined" (p. 229). Multiple definitions of giftedness decrease the interpretability and comparability of findings in this area. Evidence from one study may be not relevant for another gifted group identified because of different definitions.

2. Selection bias (Francis et al., 2016). This term refers to "any characteristic of a sample that is believed to make it different from the study population in some important way" (York, 1998, p. 239). This issue is partially related to the previous one. In empirical studies, gifted groups are typically composed of people who are enrolled in special scholastic programs. This selection strategy might over-represent highly functional gifted individuals and exclude who has never been recognized as intellectually gifted and whose potential has been masked by psychopathologies (see "twice-exceptionality; Webb et al., 2016) or by scholastic failures. Few studies have included independent measures (e.g., clinicians' observations), increasing the likelihood of this bias (Francis et al., 2016). Yet, empirical findings also have suggested that unidentified gifted might develop more emotional and behavioral risks because they may not benefit of the protective factors that gifted education may provide

(e.g., individualized attention and support) (Eklund et al., 2014; Martin, Burns, & Schonlau, 2010).

3. Method bias. This term designs that results of empirical studies can be "attributable to the measurement method rather than to the constructs the measures represent" (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003, p. 879). Although this is a common issue in social sciences, this topic is rarely discussed in giftedness studies. Indeed, scholars tend to use instruments "not satisfactorily validated by empirical research" (Zeidner & Shanovic, 2011, p. 15). This may affect reliability and validity of their results. For instance, the choice of one test can lead to finding differences that depend on the instrument itself rather than detecting a real difference between gifted and average-intelligence individuals. There is an unusual difference in the choice of instruments to assess cognitive abilities and psychological functioning of gifted people. In the first case, high intellectual functioning has been measured using well-validated intelligence (e.g., WISC-IV, SB 5, or WJ III), or achievement scales (e.g., SAT), and these tests have been consistently administered in several studies (Elliot, 2007; Lubinski & Benbow, 2006; Molinero, Mata, Calero, Garcia-Martin, & Araque-Cuenca, 2015; Rimm, Gilman, & Silverman, 2008; Rizza, McIntosh, & and McCunn, 2001; Roid, 2003). Otherwise, personality traits or psychological functioning of gifted individuals have been examined with instruments rarely used in clinical settings. Few exceptions can be found; for instance, Cross, Cassady, Dixon, and Adams (2008) administered the MMPI-A (Minnesota Multiphasic Personality Inventory-Adolescent) to 567 gifted adolescents; Zeidner and Shanovic (2011) used the OCEANIC (Roberts, 2001), a short version of the NEO-PI-R questionnaire; and Reynolds and Bradley (1983) used the RCMAS (Revised Children's Manifest Anxiety Scale) and the STAIC (State Trait Anxiety Inventory for Children).

4. Indirect indicators of psychological well-being (Rinn & Bishop, 2015). Although studies on the psychological functioning of gifted children have methodological limitations, studies that involve gifted adults have even bigger issues. Indeed, very few studies on gifted adults aimed to examine psychological constructs, such as personality traits or emotion regulation. Scholars tend to prefer using indirect measures of life-satisfaction in adulthood, such as an advanced degree in STEM (i.e., science, technology, engineering, or mathematics), number of peer-reviewed publications, or earning a patent (Park, Lubinski, & Benbow, 2008, 2013; Wai, Lubinski, Benbow, & Steiger, 2010), or family interactions (Perrone-McGovern, Boo, & Vannatter, 2012). Only a few exceptions can be found: Wirthwein and Rost (2011) have examined psychological well-being in a group of intellectually gifted young adults; Wirthwein, Becker, Loehr, and Rost (2011) have studied the controversial concept of intellectual overexcitability within adult gifted population; Perrone, Perrone, Ksiazak, Wright, and Jackson (2007) have described the relationship between self-concept and self confidence in adults with high IQ.

5. Cultural differences (Freeman, 2005). The conception of giftedness has huge international differences. Some countries have a specific education for high-ability students (e.g., United States, Israel, Spain, United Kingdom) while others do not (e.g., Finland, Denmark, Italy) (Reid & Boettger, 2015). It is beyond the aims of this dissertation determining the reasons of this difference; there are factors related to the unique history of each country, social values, philosophical conception of the education system (for overviews see Mandelman, Tan, Aljughaiman, & Grigorenko, 2010). However, giftedness education can influence positively

not only scholastic achievements but also affective outcomes (e.g., better self-concept) (Delcourt, Cornell, & Goldberg, 2007). Psychological assessment and identification of high intellectual abilities allow understanding how "the subjective experience of meeting normal challenges could be qualitatively different from others' *experience* and also sometimes hinder task accomplishment" (Peterson, 2009, p. 281) and explain to gifted individuals why they may be different from their peers. Thus, results of empirical studies conducted in different countries may not be consistent with one another because they refer to different contexts in which gifted individuals were born and grew up.

2.4.3 Research Questions

Based on the previous review, I will test differences in the functioning of personality and in emotion regulation between intellectual gifted and average-intelligence adults.

Hypothesis 1. I will expect to find strong correlations between DAPP-BQ scales associated with the Emotional Dysregulation Factor and DERS subscales and Total score because they aim to assess similar psychological domains ($r \approx .60$ to .70). Also, I will expect that DAPP-BQ Social Avoidance scales will show medium and significant correlations with DERS subscales and Total score ($r \approx .40$ to .60). Finally, DAPP-BQ Dissocial Behavior and Compulsivity scales should show from low to non-significant correlations with DERS scores. No previous studies have examined the relationships between the two tests.

Hypothesis 2. I will expect to find some differences between gifted and non-gifted individuals in personality traits using two recent and clinically-oriented self-report inventories. The results will provide descriptive measures, examining group differences in adulthood and across special populations. In particular, I expect that gifted individuals will show higher scores on Social Avoidance, both relative to feelings and behaviors; indeed, theoretical models have repeatedly connected high intellectual functioning and introversion[8] (Schmidt, 2014).

Finally, I will test score differences by gender within the gifted group. Empirical literature has been quite controversial on the differences of personality traits between gifted men and women (Cross et al., 2008; Rinn & Bishop, 2015) and specific topics were preferred to more comprehensive studies on personality (such as the role of career in gifted individuals' life, Perrone, Civiletto, Webb, & Fitch, 2004; or marital status and the choice of the partner, Perrone-McGovern, Boo, & Vannatter, 2012). Thus, if gifted individuals showed psychological vulnerabilities in some areas, men could show dysfunctional traits related to specific high-order factors, whereas women in others. The lack of information about gender differences in personality functioning of gifted adults makes this aim more explorative.

2.5 Method

2.5.1 Participants

241 individuals (192 men) participated in this study. Descriptive statistics of both samples are reported in Table 2.7. 75 of them (60 men, corresponding to 80% of the group) were identified as intellectual gifted.

[8] Introversion refers to "low levels of warmth, gregariousness, assertiveness, activity, excitement-seeking, and positive emotions" (Hauner, Adam, Mineka, Doane, ... & Griffith, 2008, p. 1344).

Table 2.7 Distribution of socio-demographic variables (i.e., gender, age and level of education) of both groups.

	Gifted Group	Comparison Group
N	75	166
Sex men, *n* (%)	60 (80.00)	132 (79.51)
Age in years (mean ± SD)	30.31 ± 7.52	26.24 ± 5.74
Age range	18 - 45	18 - 45
Level of Education in years, *n* (%)		
0-12 (Less than high school)	1 (1.33)	0
13-15 (High school or equivalent)	28 (37.33)	89 (53.61)
16-17 (Bachelor's Degree)	10 (13.33)	34 (20.48)
18+ (Master's Degree, Doctorate or more)	35 (46.66)	31 (18.67)
Index ≥ 130, *n* (%) [a]		
Full-Scale IQ	42 (56.00)	
Verbal Comprehension Index	17 (22.66)	
Perceptual Reasoning Index	49 (65.33)	
Working Memory Index	20 (26.66)	
Processing Speed Index	22 (29.33)	

[a] Indexes equal to or greater than 130 per single participants. The sum of Indexes exceeds the total number of gifted individuals because one can have more than one Index higher than 130.

Participation in the study was proposed to all Mensa members via the Association's newsletter, whereas to college students via SONA System. Individuals who were interested replied to our first email, and they were administered the WAIS-IV, the DAPP-BQ, and the DERS. Thus, inclusion criteria were to be part of Mensa Association and obtained a score equal to or higher than 130 on at least one WAIS-IV Composite Score. This sampling method was coherent with my first study and with the literature on giftedness (Gidley et al., 2003; Lang et al., 2017; Rimm et al., 2001; Wechsler, 2008a). The comparison group was composed of college students enrolled in a program at University of Milano-Bicocca and young adults; also, they could not be Mensa members. Thus, the two groups were mutually exclusive. Gifted individuals' overall age range was from 18 to 45 (*M* = 30.31, *SD* = 7.52); comparison group's overall age range was the same but the average age was statistically different (*M* = 26.24, *SD* = 5.74). Gifted participants reported the level of education essentially distributed between high school and college. Distribution by gender of gifted participants is provided in Table 2.8

2.5.2 Measures

After filling a form about socio-demographic information, WAIS-IV (Wechsler, 2008b, ed.it. 2013) was administered to participants to determine which groups they belonged to. Then, they completed DAPP-BQ and DERS. Briefly, I will provide a description of these two instruments.

Table 2.8 Distribution by gender for the intellectually gifted group.

	Gifted Men	Gifted Women
N (%)	60 (80.00)	15 (20.00)
Age in years (mean ± SD)	30.32 ± 7.63	30.27 ± 7.32
Age range	19 - 45	18 - 42
Level of Education in years, *n* (%)		
0-12 (Less than High school)	0	1 (6.66)
13-15 (High school or equivalent)	25 (41.66)	3 (20.00)
16-17 (Bachelor's Degree)	9 (15.00)	1 (6.66)
18+ (Master's Degree, Doctorate or More)	26 (43.33)	9 (60.00)

Dimensional Assessment of Personality Pathology—Basic Questionnaire (DAPP-BQ; Livesley & Jackson, 2009, ed.it. 2014). The DAPP-BQ is a 290-item self-report questionnaire which requires people to assess personal feelings and behaviors on a five-point Likert scale. Examinees evaluate how much each item describes themselves from "very unlike me" to "very like me". Individuals' personality is described on 18 traits and 4 broad second-order clusters, as described in the paragraph 2.3.3 of this chapter. A validity scale measures the level of a positive image that the examinee wants to give about himself in some areas. Each scale has a mean of 50 T-score and one standard deviation corresponds to 10. DAPP-BQ scale reliability (assessed by Cronbach's Alpha) ranges from .84 (Rejection) to .96 (Self-Harm), with an average value of .87 (Donati et al., 2014).

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004, tr.it. 2012). The DERS is a 36-item self-report questionnaire which assesses significant difficulties in emotion regulation on a five-point Likert scale. Examinees evaluate how much each item describes themselves from "almost never" to "almost always". The instrument is composed of 6 scales, as described in Table 2.9

Table 2.9 Description of DERS scales (Gratz & Roemer, 2003, p. 47).

Scales	Extended Scale Name	Description
NONACCEPTANCE	*Nonacceptance of Emotional Responses*	a tendency to display negative emotional reactions to one's negative responses, or nonaccepting emotions to one's concerns
GOALS	*Difficulties Engaging in Goal-Directed Behavior*	difficulties in acting coherently with own goals (e.g., focusing, executing a series of actions to reach goals, etc.) when experiencing negative emotional states
IMPULSE	*Impulse Control Difficulties*	difficulties keeping control of own behaviors when facing negative emotional states
AWARENESS	*Lack of Emotional Awareness*	lack of attention or awareness of emotional reactions
STRATEGIES	*Limited Access to Emotion Regulation Strategies*	the belief that strong emotional states are difficult to be regulated effectively
CLARITY	*Lack of Emotional Clarity*	the level of understanding of which emotion one is experiencing

Giromini and colleagues (2012) reported internal consistency for the Italian adaptation of the test. DERS scale reliability (assessed by Cronbach's Alpha) ranges from .77 (Awareness) to .89 (Strategies), with an average value of .84. The DERS Total score has shown strong correlations

with many variables, including avoidant coping, thought suppression, and self-injury. Other empirical studies established good construct validity and a high reliability with both clinical and nonpathological groups (Fox, Hong, & Sinha, 2008; Johnson, Zvolensky, Marshall, Gonzalez, Abrams, & Vujanovic, 2008). Also, DERS scores are associated with changes due to successful psychotherapy (Gratz, Lacroce, & Gunderson, 2006) and convergence with other measures of dysfunctions in emotion regulation (Giromini, Velotti, de Campora, Bonalume, & Zavattini, 2012). High scores on DERS scales indicate difficulties in emotion regulation.

2.5.3 Ethical Statement

All participants were recruited on a voluntary basis and they gave a written informed consent before testing. The study was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and fulfilled the ethical standard procedure recommended by the Italian Association of Psychology (AIP). The study was approved by Ethics Committee of Milan-Bicocca University.

2.5.4 Procedures and Data Analysis

Based on the Italian standardization sample, DAPP-BQ T-scores were calculated for each scale. The four second-order clusters of personality were also computed as the average of the scales associated with them (Livesley & Jackson, 2009). I considered also a fifth second-order cluster (i.e., Suspiciousness). Raw scores were used to calculate individual results on DERS because it has not been standardized in Italy. So far, two independent studies were conducted to confirm factorial structures of the test but none of them aimed to provide normative data for the Italian population (Giromini et al., 2012; Sighinolfi, Norcini Pala, Marchetti, & Sica, 2010). All participants completed DAPP-BQ, whereas all gifted individuals and a subgroup of the control group (i.e., 108 out of 166) completed the DERS[9].

Based on the hypotheses, three steps of analyses were conducted:

1. **Pearson's correlations** to investigate the relationships between DAPP-BQ and DERS scales and second-order clusters.
2. **MANCOVA** to test differences in personality traits and emotional regulation areas between gifted and non-gifted adults. Since the age of the two groups was statistically different, this variable was used as a covariate. To estimate the magnitude of the effects, Eta Partial Square (η^2) was calculated for each dependent variable.
3. **Multiple t-tests** to measure differences by gender within the gifted group. Based on exploratory approach, I did not report the p-value for each comparison but only the effect size. This was computed by dividing the difference between mean group scores by the pooled standard deviation for each scale. Because of many comparisons were made in these analyses, Type I error must be considered when the reader will look at the data.

All the analyses were performed with SPSS 24 (IBM, 2016).

[9] The comparison subgroup and the total comparison group had the same distribution in terms of socio-demographic characteristics. Thus, data analyses did not require different procedures.

2.5.5 Results

First, the reliability of the two tests was determined to calculate Cronbach's α (Table 2.10). DAPP-BQ clusters have shown reliability coefficients from acceptable (α > .70) to excellent (α > .90) for both groups. According to previous studies on DERS (Giromini et al., 2012; Gratz & Roemer, 2004), Cronbach's α indicated that five out of six subscales of the inventory had internal consistency values from good (α > .80) to excellent (α > .90). The only subscale with an acceptable alpha was Awareness (α = .68 for the comparison group and α = .72 for the gifted group). This is consistent with most of the studies which have tried to replicate the original structure of the DERS. Internal consistency was not calculated for Compulsivity and Suspiciousness because these second-order Clusters are composed of one single scale.

Table 2.10 Cronbach's alpha for DAPP-BQ and DERS scales.

	Gifted Group	Comparison Group
DAPP-BQ		
Emotional Dysregulation	.90	.90
Dissocial Behavior	.78	.82
Social Avoidance	.74	.72
DERS		
Nonacceptance	.92	.90
Goals	.91	.91
Impulse	.91	.91
Awareness	.72	.68
Strategies	.94	.88
Clarity	.94	.86
DERS Total	.83	.83

Cronbach's Alpha interpretations: α ≥ 0.9 excellent; α ≥ 0.8 good; α ≥ 0.7 acceptable; α ≥ 0.6 questionable; α ≥ 0.6 poor; α < 0.5 unacceptable.

Correlations among DERS and DAPP-BQ were reported in Table 2.11 and in Table 2.12. As expected, their scales were correlated with one another. However, distinct correlational patterns indicated the different strength of relationships between personality traits and components of emotional regulation. In general, DERS scores showed the strongest correlations with DAPP-BQ Emotion Dysregulation Factor (r = .72); in particular, Strategies (DERS) showed strong correlations with Anxiousness (DAPP-BQ) (r = .67) and Identity Problems (DAPP-BQ) (r = .71). Most of the DERS scales had moderate correlations with scales associated with Emotion Dysregulation (DAPP-BQ), but Awareness. This scale had the weakest correlations with DAPP scales (r from 0.11 to 0.35). On the DAPP-BQ side, Insecure Attachment showed relationships from nonsignificant to weak with DERS scales. As expected, the DERS Total score showed the weakest associations with Dissocial Behavior (r = .38). A similar correlation was found between DAPP-BQ Emotion Dysregulation and Dissocial Behavior (r = .35). Moreover, the correlations between DERS Total score and DAPP-BQ Social Avoidance Factor reached moderate levels (r = .58). Compulsivity had no relation with Emotion Regulation, whereas Suspiciousness showed weak but significant correlations with DERS scales (r from 0.10 to 0.41).

Table 2.11 Correlation Matrix between DAPP-BQ and DERS scales.

	Nonacceptance	Goals	Impulse	Awareness	Strategies	Clarity
Anxiousness	.55**	.54**	.54**	.26**	.67**	.55**
Submissiveness	.41**	.37**	.32**	.30**	.36**	.49**
Insecure Attachment	.21*	.21*	.32**	.11	.31**	.22*
Affective Lability	.41**	.46**	.59**	.18^	.62**	.46**
Oppositionality	.42**	.57**	.44**	.32**	.52**	.54**
Identity Problems	.52**	.52**	.53**	.35**	.71**	.53**
Cognitive Dysregulation	.50**	.54**	.56**	.25**	.55**	.54**
Callousness	.17^	.34**	.23*	.14	.34**	.18^
Narcissism	.24**	.33**	.30**	.05	.35**	.28**
Conduct Problems	.20*	.29**	.39**	.24*	.28**	.29**
Stimulus Seeking	.18^	.21*	.26**	.05	.22*	.28**
Rejection	.05	.18^	.17^	.01	.16^	.09
Low Affiliation	.49**	.52**	.46**	.28**	.62**	.46**
Restricted Expression	.39**	.39**	.32**	.32**	.42**	.35**
Intimacy Problems	.27**	.19^	.18^	.34**	.32**	.30**
Compulsivity	.00	.05	-.03	-.10	.00	.07
Suspiciousness	.35**	.32**	.39**	.10	.41**	.23*

Legend: ** $p \leq .001$; * $p \leq .01$; ^ $p \leq .05$.

Table 2.12 Correlations between DAPP-BQ second-order clusters and DERS Total score.

	Emotional Dysregulation	Dissocial Behavior	Social Avoidance	Compulsivity	Suspiciousness	DERS Total
Emotional Dysregulation	1					
Dissocial Behavior	.52**	1				
Social Avoidance	.63**	.36**	1			
Compulsivity	.04	.05	.07	1		
Suspiciousness	.58**	.52**	.49**	.30**	1	
DERS Total	.76**	.39**	.58**	.20	.43**	1

Legend: ** $p \leq .001$; * $p \leq .01$; ^ $p \leq .05$.

A preliminary Exploratory Factor Analysis (EFA) with Principal Axis factoring and Oblimin rotation was conducted to test if DAPP-BQ scales group into meaningful factors. DAPP-BQ four-factor structure was established based on eigenvalues greater than 1 (7.02, 2.00, 1.47, and 1.37), parallel analysis (which suggested to extract four components), and second-order Clusters proposed in the test manual (Figure 2.1[10]). Overall, four factors were consistent with the original structure, except for Low Affiliation scale which had a strong loading on Emotional Dysregulation and a weak loading on Social Avoidance.

[10] R code to plot Factor Analysis results was provided by Dr. Dan Mirman, and it is available here: http://mindingthebrain.blogspot.com/2015/04/plotting-factor-analysis-results.html

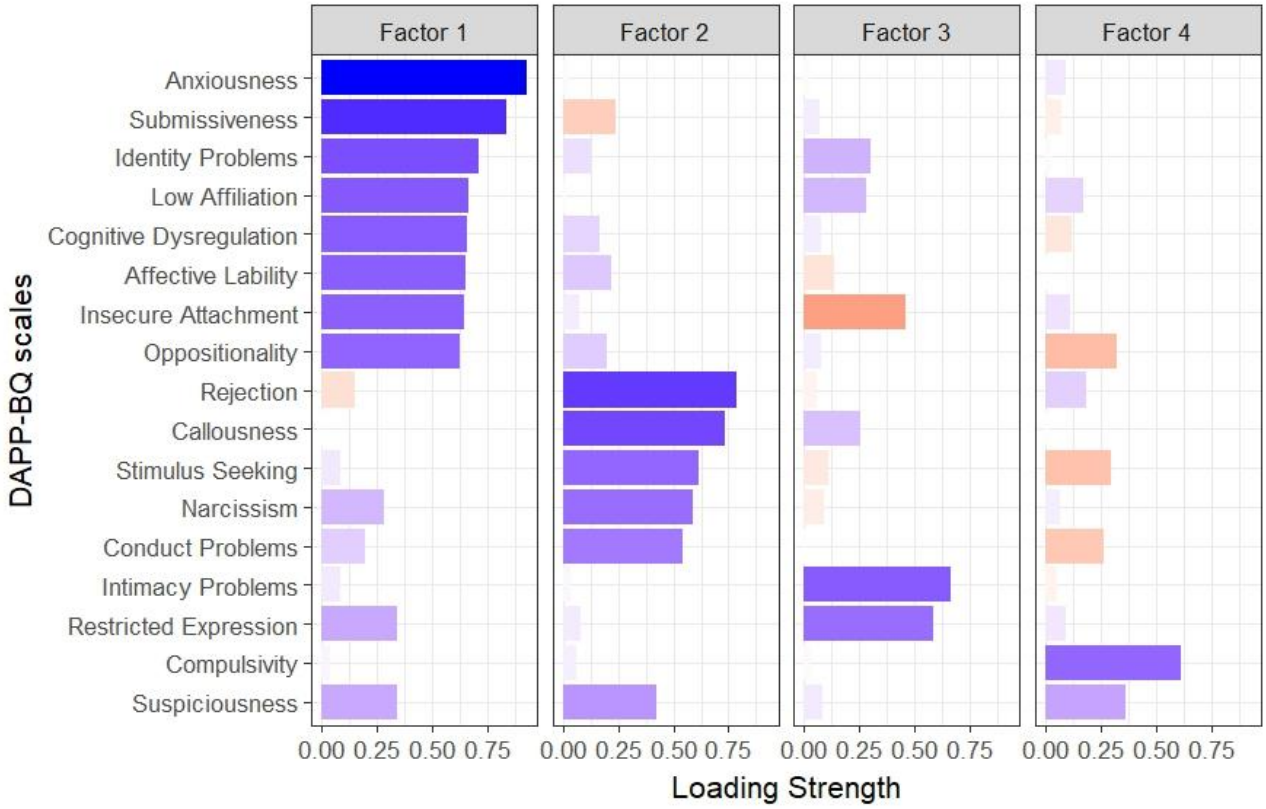

Figure 2.1 The longer the bars, the stronger the loadings on Factors. Blue indicates positive loading and red indicates negative loadings. Fit measures: Tucker Lewis Index (TLI) of factoring reliability = .806; RMSEA Index = .121 [90% CIs = .105, .131]; BIC = -87.08.

Then, the difference between gifted and non-gifted adults was tested with a multivariate analysis of covariance (MANCOVA) on all DAPP-BQ and DERS scales. Age was used as a covariate because it was statistically significant between the two groups, $t(247)=5.289$, $p < .001$. All assumptions were met and analyses revealed a main effect of group for DAPP-BQ, $\Lambda = .67$, $F(18, 227) = 6.24$, $p < .001$; whereas a nonsignificant main effect of group for DERS, $\Lambda = .77$, $F(9, 174) = 5.89$, .138. Results for the post hoc univariate ANOVAs are showed in Table 2.13

About DAPP-BQ, all subscales were normally distributed but Self-Harm which had high skewness and kurtosis[11]. Mean differences for 8 out of the 17 subscales were statistically significant after applying Bonferroni correction. When the difference was significant, the gifted group always obtained higher results than the comparison group which means they were more likely to show vulnerabilities in personality traits. Large effect size was found on Rejection subscale ($\eta^2 = 0.15$). Medium effect sizes were noted on Narcissism ($\eta^2 = 0.10$) and Low Affiliation ($\eta^2 = 0.07$) scale. Mean differences on Identity Problems ($\eta^2 = 0.02$), Callousness ($\eta^2 = 0.03$), Restricted Expression ($\eta^2 = 0.04$), Compulsivity ($\eta^2 = 0.04$), and Suspiciousness ($\eta^2 = 0.05$) were also found statistically significant and they showed small effect sizes. Then, univariate ANOVAs were performed for each second-order cluster composed of more than one subscale. All assumptions were met. Intellectual

[11] Self-Harm has been included in the DAPP-BQ because it represents an important risk factor in clinical setting. However, the focus of this chapter is on personality functioning and emotion regulation of gifted adults. This means that self-harm was beyond my goals; hence I did not include this scale in data analysis. Though, an interesting literature review on giftedness and suicidal behaviors can be retrieved in T.L. Cross & J.R. Cross, 2017.

gifted individuals had higher score on Dissocial Behavior ($p < .001$, $\eta^2 = 0.08$) and on Social Avoidance ($p < .001$, $\eta^2 = 0.04$).

Table 2.13 DAPP-BQ and DERS Group Differences. Main effects of Group were controlled for age.

	Intellectually Gifted		Comparison Group				
Scales	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
DAPP-BQ							
Emotional Dysregulation	48.53	9.99	48.58	7.97	0.73	NS	0.00
Anxiousness	50.35	14.39	49.28	10.96	2.09	NS	0.01
Submissiveness	47.57	11.73	49.23	9.93	0.53	NS	0.00
Insecure Attachment	43.62	10.70	46.68	9.78	1.93	NS	0.01
Affective Lability	47.61	13.38	47.01	10.28	0.63	NS	0.00
Oppositionality	50.64	13.38	50.26	10.38	1.32	NS	0.00
Identity Problems	52.22	12.64	49.73	9.80	5.55	<.05	0.02^
Cognitive Dysregulation	47.74	11.29	47.91	9.62	0.65	NS	0.00
Dissocial Behavior	53.62	7.45	50.20	7.01	21.04	<.001	0.08*
Callousness	53.69	9.53	50.94	9.10	8.33	<.01	0.03^
Narcissism	56.70	10.62	50.73	10.23	28.28	<.001	0.10*
Conduct Problems	50.04	8.02	49.94	7.60	0.71	NS	0.00
Stimulus Seeking	50.31	11.80	49.78	9.82	1.10	NS	0.00
Rejection	57.35	10.92	49.59	8.85	42.88	<.001	0.15**
Social Avoidance	54.20	9.70	50.54	8.35	11.27	.001	0.04^
Low Affiliation	56.11	12.48	50.44	10.10	18.34	<.001	0.07*
Restricted Expression	56.28	12.40	51.91	10.98	9.05	<.01	0.04^
Intimacy Problems	50.22	11.07	49.28	10.12	0.53	NS	0.00
Compulsivity	53.73	10.94	48.81	10.12	9.13	<.01	0.04^
Suspiciousness	53.76	10.88	49.67	8.25	11.68	.001	0.05^
Validity	48.19	8.88	46.28	7.13	1.46	NS	0.01
DERS							
DERS Total	81.96	25.10	78.88	20.74	4.16	<.05	0.02^
Nonacceptance	13.44	6.27	12.51	5.34	2.72	NS	0.02
Goals	14.03	5.02	13.28	4.66	4.71	<.05	0.03^
Impulse	11.69	5.03	11.72	4.83	0.87	NS	0.01
Awareness	14.43	3.79	14.69	3.55	0.41	NS	0.00
Strategies	17.64	8.23	16.19	5.84	7.32	<.01	0.04^
Clarity	10.73	4.60	10.48	3.59	1.67	NS	0.01

Effect size' interpretations: $\eta^2 > 0.01$ small effect (^); $\eta^2 \geq 0.06$ medium effect (*); $\eta^2 \geq 0.14$ large effect (**).
NS = Not Significant.
Cluster and Total scores of DAPP-BQ and DERS are bolded and precede subscales they consisted of.

About DERS, all subscales showed a distribution approximately normal (i.e., Skewness and Kurtosis values less than |1|). Mean differences for 2 of the 6 subscales were statistically significant after using Bonferroni correction. When differences were significant, the gifted group had higher results than the comparison group which means they were more likely to report difficulties in emotion regulation. In particular, small effect sizes were noted on Goals and Strategies subscales ($\eta^2 = 0.03$ and 0.04, respectively). Finally, between-group univariate ANOVA revealed that

intellectually gifted group differed significantly from the average-intelligence group on DERS Total score ($F = 4.16$, $p < .05$, $\eta^2 = 0.02$).

Table 2.14 Gender Differences on DAPP-BQ and DERS within the Gifted Group.

	Gifted Men (N = 60)		Gifted Women (N = 15)		
Scales	*M*	*SD*	*M*	*SD*	Cohen's *d* [95% CI]
DAPP-BQ					
Emotional Dysregulation	47.50	9.92	52.90	10.06	-0.55* [-3.06, 4.54]
Anxiousness	48.78	14.04	57.23	14.62	-0.61* [-4.16, 6.79]
Submissiveness	46.41	11.26	52.43	13.10	-0.53* [-3.37, 6.10]
Insecure Attachment	43.39	10.72	44.98	12.35	-0.15 [-2.86, 6.10]
Affective Lability	46.43	13.80	54.01	8.64	-0.59* [-4.08, 3.78]
Oppositionality	49.69	13.83	52.55	12.39	-0.21^ [-3.71, 6.06]
Identity Problems	51.16	12.41	57.34	12.92	-0.50* [-3.64, 6.04]
Cognitive Dysregulation	46.68	11.25	51.77	11.28	-0.46^ [-3.30, 5.25]
Dissocial Behavior	53.88	7.92	52.55	4.89	0.18 [-1.82, 2.66]
Callousness	54.23	10.08	50.78	5.78	0.37^ [-2.18, 3.30]
Narcissism	57.32	10.82	54.66	10.60	0.25^ [-2.49, 5.61]
Conduct Problems	49.91	7.47	50.70	10.55	-0.10 [-1.99, 5.24]
Stimulus Seeking	50.21	12.40	50.35	10.58	-0.01 [-3.15, 5.34]
Rejection	57.75	10.70	56.27	10.13	0.14 [-2.57, 5.27]
Social Avoidance	53.27	9.42	57.69	10.15	-0.47^ [-2.85, 4.67]
Low Affiliation	54.89	12.02	61.80	13.39	-0.57* [-3.61, 6.21]
Restricted Expression	55.43	12.06	59.25	13.56	-0.31^ [-3.36, 6.55]
Intimacy Problems	49.50	11.33	52.03	9.30	-0.23^ [-3.10, 4.47]
Compulsivity	53.62	10.80	54.35	13.47	-0.06 [-2.80, 6.75]
Suspiciousness	53.48	10.80	54.12	13.15	-0.06 [-2.79, 6.60]
Self-harm	51.61	9.94	51.75	9.52	-0.02 [-2.53, 4.80]
Validity	48.04	9.25	47.21	6.41	0.10 [-2.24, 3.34]
DERS					
DERS Total	77.89	22.12	99.77	30.30	-0.93** [-6.52, 14.41]
Nonacceptance	12.61	5.70	17.08	7.56	-0.75* [-2.18, 3.08]
Goals	13.65	4.88	15.69	5.51	-0.41^ [-1.65, 2.38]
Impulse	10.88	4.77	15.23	4.73	-0.93** [-2.13, 1.47]
Awareness	14.12	3.59	15.77	4.49	-0.44^ [-1.35, 1.83]
Strategies	16.54	7.40	22.46	10.15	-0.76* [-2.62, 4.39]
Clarity	10.09	3.93	13.54	6.24	-0.79* [-1.78, 2.37]

Effect size' interpretations: Cohen's $d \geq 0.20$ small effect (^); $d \geq 0.50$ medium effect (*); $d \geq 0.80$ large effect (**).
Negative effect sizes mean that women have higher scores on the scale.
Cluster and Total scores of DAPP-BQ and DERS are bolded and precede subscales they consisted of.

Finally, Cohen's *d* was used to detect gender differences within the gifted group (Table 2.14). I decided not to conduct more sophisticated statistical analyses because of the large unbalance between the two groups and the small group of gifted women. However, gender differences within gifted individuals seem to matter both in personality functioning and in emotional regulation

domains. When differences were associated with medium or high effect size, gifted women always had higher results than gifted men which means they were more likely to report personality vulnerabilities and difficulties in emotions regulation. Medium effect sizes were found on Anxiousness (Cohen's $d = 0.61$), Submissiveness (Cohen's $d = 0.53$), Affective Lability (Cohen's $d = 0.59$), Identity Problems (Cohen's $d = 0.50$), and Low Affiliation (Cohen's $d = 0.57$). Moreover, a medium effect size (Cohen's $d = 0.55$) was observed on Emotional Dysregulation Cluster. Large effect sizes were also noticed on most of the DERS subscales and Total score (i.e., 4 out of 6 DERS subscale scores had Cohen's *d* higher than 0.75).

2.6 Discussion

The main objectives of the study were: (a) to examine linear relationships between DAPP-BQ and DERS subscales and broad factors; (b) to study group differences in personality traits between gifted and non-gifted individuals in the light of the framework of developmental psychology and psychopathology; (c) to explore individual differences between men and women within the gifted group.

First, about linear relationships between the two self-attribution tests, five out of the six subscales of the DERS showed from moderate to strong associations with the DAPP-BQ Emotion Dysregulation, confirming that they may measure similar psychological dimensions. Emotion Dysregulation cluster is composed of a variety of domains that have common features related to emotional and relational instability. People who have a high score on this cluster tend to feel recurrent mood changes and unstable emotions. They can have specific weaknesses in self-esteem regulation and identity stability, adopt maladaptive behavioral schemas, be easily vulnerable to stressful events, and be worried by lack of strong and intense relationships with others. Similar dimensions have been considered by Gratz and Roemer (2004) to create the DERS. In fact, their operationalization of Emotional Dysregulation involves "the awareness and understanding of emotions, acceptance of emotions, ability to control impulsive behaviors and behave in accordance with desired goals when experiencing negative emotions, and ability to use situationally-appropriate emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands" (p. 42). Moreover, DERS subscales showed moderate or strong correlations with the DAPP-BQ Social Avoidance cluster. This is not an unexpected finding because the relationship between these two DAPP-BQ Broad Factors is also strong (Kushner, Quilty, Tackett, & Bagby, 2011).

The two tests may show some differences in psychological constructs that they intend to measure: DAPP-BQ Insecure Attachment and DERS Awareness scales showed the lowest associations with the other scale. Thus, this information can be useful for clinicians who consider using one of the two questionnaires in clinical settings. Of course, DAPP-BQ is typically used to assess most personality traits and the DERS is a quick screener to assess the principal dimensions of emotional regulation. However, if clinicians are interested in examining patient's emotional awareness, the DERS should be administered because DAPP-BQ does not explore that particular area. By contrast, if practitioners wish to evaluate how patients' coping strategies depend on other people and how urgently and desperately they seek their proximity during stressful events, they should decide to add the DAPP-BQ in their test battery.

As expected, DERS subscales showed the lowest associations with DAPP-BQ Dissocial Behavior and Compulsiveness clusters. Similar results were found in other studies (Kushner et al., 2011; Van

den Broeck, Bastiaansen, Rossi, Dierckx, De Clercq, & Hofmans, 2014). Using the bass-ackwards method[12] (Goldberg, 2006), the fundamental subdivision in the DAPP-BQ structure was between "Internalizing/Emotional Dysregulation" and "Externalizing/Dissocial Behavior" component (Van den Broek et al., 2014, p. 204). In general, DAPP-BQ and DERS display a high level of overlap but they still have their own peculiarities that make them useful in different contexts (such as screening vs. deep examination of personality traits) or different aims (e.g., interests in investigating narrow psychological domains).

Second, gifted individuals showed higher scores both on DAPP-BQ and DERS subscales and broad factors. Group differences were found between gifted adults and the general population in many personality characteristics; if a difference was statistically significant, gifted individuals scored higher than average-intelligence people[13]. From a developmental perspective, dysfunctional personality traits may be the consequence of emotions and feeling that people with extraordinary intellectual abilities have not understood since they were children. Their needs and expectations may not have been satisfied by parents and significant others because of large differences in intellectual functioning. Gifted individuals could ignore the reasons why they were not supported adequately and they may be unaware of aspects of their personality which make harder to meet others and establish important relationships with them. Below I will focus on the scales on which the two groups have shown the largest differences. I will consider empirical studies which have looked for similar constructs and I will discuss them in light of the Academic and Occupational Achievement Model (Schmidt, 2014), the disharmony hypothesis (Preckel et al., 2015), and the role that sociocultural issues (e.g., cognitive overqualification in the workplace, minority stress, stereotypes) in maintaining psychological vulnerabilities (Baudson & Ziemes, 2016; Fine & Nevo, 2008).

Gifted individuals reported higher scores on DAPP-BQ Rejection subscale which means that they may perceive themselves as interpersonal dominant, relational hostile, and characterized by a rigid cognitive style. The large effect size makes it the most distinctive personality trait of gifted individuals. According to the manual of the DAPP-BQ (Livesley & Jackson, 2009), people who obtain high scores on this subscale are antagonistic to the others; seek to dominate, influence, and take control over them; tend to judge and disapprove openly others' ideas and behaviors; hold fixed ideas and expectations; and have no concerns in getting involved in challenges. Validity studies showed that this scale is strongly related to NEO-PI/FFM Antagonism Facet (Larstone, Jang, Livesley, Vernon, & Wolf, 2002; Livesley & Jackson, 2009; Schroeder, Wormworth, Livesley, 1992). Crowe, Lynam, and Miller (2017) examined which psychological domains underlie this broad trait; using the bass-ackwards approach, they concluded that Antagonism is composed of five sub-traits, i.e. Callousness, Immorality (≈ DAPP-BQ Conduct Problems), Arrogance and Combativeness (≈ DAPP-BQ Rejection), and Distrust (≈ DAPP-BQ Suspiciousness)[14]. Gifted group obtained higher scores than the comparison group on all these subscales, but Conduct Problems. Empirical studies have found that Antagonism is often a core component of dysfunctional

[12] This statistical approach involves the top-down extraction of higher order factors to define a hierarchical structure from a set of first-level variables.

[13] In both self-attribution questionnaires, higher scores indicate vulnerabilities and dysfunctional personality traits. DAPP-BQ Compulsivity is the only subscale (and cluster) where lower scores do not indicate necessarily a better psychological functioning and adjustment.

[14] NEO-PI/FFM Facets are interpreted differently compared to DAPP-BQ subscales. Higher scores correspond to a better and healthier personality functioning. I reported the psychopathological side of each factor because they can match with the interpretation of the tests I used in the present study.

adjustment traits (Samuel & Widiger, 2008). On the opposite side of the continuum, Agreeableness has been associated with positive life outcomes and psychological characteristics, such as job performance (Witt, Burke, Barrick, & Mount, 2002), emotional regulation (DeNeve & Cooper, 1998), respectful and cooperative behaviors (Graziano, Habashi, Sheese, & Tobin, 2007).

Gifted individuals have reported higher scores on Antagonism in other studies. For instance, Zeidner and Shani-Zinovich (2011) showed that Israeli gifted adolescents scored lower on Agreeableness. The authors commented this finding cautiously because the literature on this topic has repeatedly reported better psychological outcomes for gifted individuals; indeed, they interpreted lower scores as an advantage because evidence from occupational studies has often underlined the relationship between low agreeableness and need for competition and perfectionism (Boudreau, Boswell, & Judge, 2001). This argument may be valid to explain that dysfunctional traits can be used productively whether interpersonal relationships and society provide an appropriate environment for one's psychological development. Others' responsive support and openness can decrease the sense of unfamiliarity, or non-involvement that gifted people tend to experience. However, these findings highlight that gifted individuals are not immunized from negative psychological outcomes. Dijkstra and colleagues (2012) administered the NEO-PI to a large group of Mensa members who also reported lower scores in this domain. Recurring childhood experiences of feeling "different" (Freeman, 2008) may increase the likelihood to develop an inward oriented personality; this tendency may indicate that gifted individuals prefer investing on their thoughts and ideas rather than obtaining gratification from interpersonal interactions. Thus, they may be not interested to socialize or get involved in relationships with others. They may also have experienced repetitive interpersonal failure and they may have stopped to look for intimacy and proximity to other people. Yet, other empirical studies pointed out that gifted adults have higher consideration for their intellectual abilities and personal achievements than their social and emotional skills (Burdick, Kreicker, & Klopfer, 1981; Pollet & Schnell, 2017).

It is remarkable that higher scores on Antagonism facet of gifted individuals have often been linked with social isolation traits (Dijkstra, Barelds, Ronner, & Nauta, 2012). Indeed, in the present study, I found statistically significant group differences on Low Affiliation subscale. This means that people with high intellectual abilities may have few friends and a general preference for situations that require few social contacts; they tend to refuse opportunities to meet new people, and do not get pleasure from interpersonal relationships. According to Livesley and Jackson's definition (2009), people who obtain high scores on this subscale prefer avoiding most of social exchanges and interactions. They may appear socially reserved, unfriendly, and relational detached. This trait, like the others included in Social Avoidance cluster, is related to large difficulties in making friends and establishing affective relationships.

High levels of low affiliation may be associated with poor conversational and social skills; gifted individuals may experience difficulties in social situations because they may be unaware of what behavior is more appropriate for particular contexts. For this reason, some authors have explored the link between giftedness, high-functioning Asperger syndrome (Boschi, Planche, Hemimou, Demily, & Vaivre-Douret, 2016; Guénolé, Louis, Creveuil, Baleyte, Montlahuc, Fourneret, & Revol, 2013; Liratni & Pry, 2011; Neihart, 1999) and the development of the Theory of Mind[15]

[15] ToM refers to a set of social and skills which develop considerably in childhood. This term was coined by Premack and Woodruff (1978) to describe the capability of interpreting others' state of mind (such as thoughts, feelings, motivations, intentions, and goals) and taking their perspective. Moreover, ToM includes the ability of understanding

(ToM). Davis and Rimm (1998) highlighted positive and negative characteristics of gifted individuals' ToM. On one side, positive skills may involve superior metacognition, and high emotional attention and sensitivity (Walker & Shore, 2011). On the other side, interpersonal difficulties of gifted people may be interpreted as a negative indirect aspect of ToM. However, few studies have examined this topic and there is disagreement about the interpretation of this trait. For instance, some authors recognized that gifted students are loners in school (French & Shore, 2009; Walker & Shore, 2011) and tend to convers or spend time with people of the same level of intelligence (F. Schmidt, personal communication, November 2017); these patterns may be dissimilar from general population but not necessarily markers of pathological functioning. Indeed, atypical trajectories may lead to developing individual strengths and weaknesses, even demonstrating that some domains (i.e., cognitive abilities) may evolve at a higher level than typical individuals (Thomas & Karmiloff-Smith, 2002).

In general, gifted individuals tend to be not strongly motivated in social interactions and may not understand which strategies they should employ. For this reason, clinicians often prefer to help gifted clients to accept this trait and to find a favorable lifestyle rather than attempt deep changes which may produce insignificant benefits (Grobman, 2009; Neihart, 1999; Rinn & Bishop, 2015). Leta Hollingworth (1942) was the first scholar who explained why gifted individuals may develop this trait. She suggested that they tend to meet difficulties in making friends since they are children. From an early age, high intelligence people need to find peers who are like themselves; thus, they can think at the same level of complexity and hopefully share same interests. For example, Clark and Hankins (1985) interviewed a large group of gifted students in elementary school. They found that gifted children knew more about news reports and politics than their classmates, and they could think and discuss about philosophical topics (e.g., the relationship between good and evil). Because of the fear of being hurt or embarrassed in a social situation, gifted individuals may have intentionally and repeatedly recurred to behavioral strategies for hiding their personality (Gross, 1998, 2004). Also, this may have temporary negative consequences on their intellectual efficacy. That is why gifted individuals could have difficulties to use their cognitive abilities to solve relational impairments. By contrast, students who joined a summer program for gifted were happy and peaceful because eventually they met the opportunity to get along with their peers.

From a clinical perspective, some gifted clients may report psychological issues associated with their high intellectual functioning (Boschi et al., 2016). While certainly there are gifted individuals who do not report any psychological disorders, other people may be particularly vulnerable to develop specific dysfunctional personality traits. Some of them may be twice-exceptional (i.e., gifted individuals who suffer from psychological disorders, such as learning disabilities in childhood, or autistic traits in adulthood); others may mimic clinical characteristics common in Asperger syndrome (such as relational difficulties, emotion dysregulation, focus on unusual hobbies and monotonous interests, engagements into intellectual speculations or attention deficits) (Boschi et al., 2016; Burger-Veltmeijer & Minnaert, 2011; Doobay, Foley-Nicpon, Ali, & Assouline, 2014; Neihart, 1999). These features are not always present in the same person − hence they would not be a part of the giftedness *per se* – but a result of inappropriate responses of environment and society in childhood (Preckel et al., 2015). Below I will discuss in more details about the role that society can play as a risk or protective factor for the development of psychological maladjustments of gifted individuals (Freeman, 2008).

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and predicting other people's behaviors. A well-developed ToM is "crucial for making social inferences and guiding social behavior in communicative interactions" (Geurts & Lever, 2017, p. 96).

On the other side, introversion has been traditionally related to high intellectual abilities (Ackerman, 1996, 1999; Goff & Ackerman, 1992). In the Academic and Occupational Achievement Model, Schmidt (2014) describes developmental associations between social isolation, crystallized intelligence, and adult academic and occupation attainments (see Figure 3.1). Introversion has been found positively related to intellectual curiosity (TIE, i.e. Typical Intellectual Engagement) (equivalent to "need for cognition", von Stumm, Hell, & Chamorro-Premuzic, 2011; or "general learning", Schmidt, 2014) which in turn is correlated with domain-specific knowledge and crystallized intelligence attained over time. Empirical evidence has been found for many areas of human knowledge, such as physical sciences and math; social sciences, law, and economics; Western history; art and literature; and technology (Ackerman & Heggestad, 1997). Thus, introverts and high TIE people tend to increase their level knowledge in specialized discipline domains more than people with different personality traits and attitudes. So far, the role of each component has not been completely explored. Introversion might be indirectly related to *Gc*, and it might be completely or partially mediated by TIE. Schmidt (2014) suggested that seeking knowledge in a large variety of knowledge domains could have a direct role in the development of crystallized intelligence; thus, gifted individuals may extend their abilities, spending more time in reading, thinking, and reasoning, rather than joining social relationships. Indeed, they may experience a sense of mastery and deep self-efficacy in these activities. Fluid intelligence and specific interests may influence the development of *Gc*, which is described in Cattell's investment theory (Cattell, 1963, 1987) as acquired knowledge and verbal abilities. I have already presented this theory in the Discussion section of the Chapter 1 (§ 1.4).

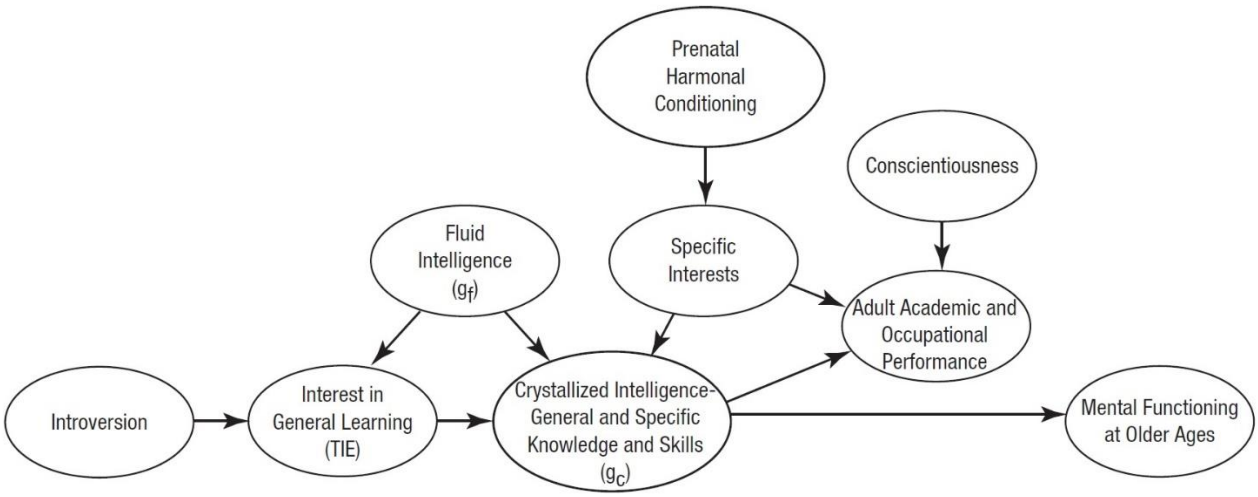

Figure 2.2 Academic and Occupational Achievement Model by Frank Schmidt. Reprinted with permission of the author from "A General Theoretical Integrative Model of Individual Differences in Interests, Abilities, Personality Traits, and Academic and Occupational Achievement: A Commentary on Four Recent Articles" (Schmidt, 2014, p. 214). Copyright © 2014 SAGE.

In his model, Schmidt hypothesizes that Conscientiousness may also contribute directly to adult academic and occupation performance. Indeed, it may promote a tendency to prefer order, structure, planning, and accuracy. Gifted individuals obtained significantly higher scores on DAPP-BQ Compulsiveness cluster which has shown moderate correlations with Conscientiousness ($r \approx 0.50$) (Jang & Livesley, 1999; Livesley & Jackson, 2009). However, this finding must interpret carefully because the effect size was small and the relationship between conscientiousness and intelligence is still not clear (Ackerman & Heggestad, 1997). In some cases, moderate high scores on this subscale may represent a protective factor against emotional maladjustments and severe psychological

disorders and with academic and job performance (Barrick & Mount, 1991; von Stumm et al., 2011). In other cases, compulsivity/conscientiousness may increase the individual level of perfectionism which has been often associated with intellectual giftedness (Dixon et al., 2004; Guignard, Jacquet, & Lubart, 2012; LoCicero & Ashby, 2000; Neumeister, 2004; Rice & Ray, 2017). Moreover, Dijkstra and colleagues (2012) did not find any differences on this trait comparing gifted and nongifted individuals. Moutafi, Furnham, and Paltiel (2004) showed that *Gf* and conscientiousness were negatively correlated. One possible explanation for such different results is that this relationship may vary depending on specific interests and tasks (i.e., Conscientiousness may be correlated with conventionalism and traditionalism) (Ackerman & Heggestad, 1997).

Finally, the gifted group showed higher level on Narcissism subscale. This means that they tend to overstress their academic achievements and intellectual abilities, and personal skills. They may feel a strong sense of "entitlement" which reflects their belief to be special; thus, they think they deserve to be treated differently from other people (Glickauf-Hughes, Wells, & Genirberg, 1987). These traits in gifted individuals may represent important protective factors because moderate inflation of self-esteem may prevent being hurt by others' failures in recognizing and supporting their needs. Alice Miller (1981) described from a psychoanalytical perspective how people with extraordinary talents and achievements may be particularly sensitive to develop a "narcissistic vulnerability". Silverman (1993) hypothesized that psychological conflicts between the need to be recognized and valued, and the stress that comes from strong efforts to hide these needs may produce further vulnerabilities in identity development. In social relationships, they often tend to idealize others because this reflects positively on the Self and makes their self-esteem stronger; however, if they are disappointed, they may rapidly change to devaluation.

However, differences on narcissistic traits have not been found consistently in empirical studies. For instance, Cross and colleagues (2008) described scores obtained from a large sample of gifted adolescents. Although the authors used the MMPI-A (which does not include a direct measure of Narcissism), an 8-9/9-8 code-type (i.e., Schizophrenia and Mania) and high scores on the F scale[16] are often interpreted as a good measure of this trait (Archer, 2005; Raskin & Novacek, 1989). Contrary to my finding, gifted students did not show higher dysfunctional levels of self-importance and grandiosity compared to the non-gifted counterpart. Moreover, Baggette and Tobacyk (1988) examined the level of narcissism of gifted adults, administering the Narcissistic Personality Inventory; no differences were noted between gifted and non-gifted adults on this trait of personality. These finding may be inconsistent with one another because gifted individuals have actual exceptional abilities for which they could have been recognized and valued since they were children. For this reason, they may not have experienced strong needs to receive extra-attention and they may have learnt how to self-regulate their own self-esteem. No studies have examined this topic which may be a fruitful line of future researches.

Also, DERS gifted scores revealed that they may have slight difficulties to act when experiencing negative feelings, which could interfere to their capabilities of reaching coherently their goals (e.g., focusing, executing a series of multiple actions, etc.) and of regulating effectively strong emotional states. Additional studies are required to establish if these differences can be considered part of

[16] The F scale includes a variety of items related to strange or unusual experiences, thoughts, and sensations; paranoid ideation; and antisocial attitudes and behaviors. It has been often interpreted as an indicator of individuals' tendency to over-report psychological symptoms. This inclination can be explained by many different reasons.

personality functioning of gifted individuals. However, it seems unlikely that emotion regulation can be the core of group differences between gifted and average-intelligence people.

However, I want to stress again that current results should not lead clinicians and practitioners to interpret giftedness as a psychopathological category. Based on these finding, I do not agree with authors who have suggested the concept of "gifted personalities" (Wellisch & Brown, 2013). There is no such a thing as a rigid set of personality traits associated with gifted individuals. In light of developmental psychology and psychopathology theory, personality is the result of multiple processes (i.e., cognitive, biological, social and emotional) that influence reciprocally one another over one's lifespan (Cicchetti & Curtis, 2006). It reflects how individuals have been able to adapt themselves to the environment in order to face specific and significant challenges at certain ages (e.g., relationships with parents, interactions with peers at school, emotional regulation when facing stressful events, etc.). If failures occur, they do not inevitably determine psychopathological disorders but they are more likely to promote maladaptive behaviors. Thus, gifted individuals can develop adaptive personality but they may be constrained by their past experiences and the influences of multiple environmental systems (such as society, culture, stereotypes, etc.) (Brofenbrenner, 1979; Sroufe, 1997). In fact, gifted people are not immune from developing psychological disorders or maladjustments, such as social avoidance, narcissism, compulsivity, perfectionism, difficulty with authorities, etc. These variables can increase psychological vulnerabilities (Bailey, 2011; Peterson, 2009). Moreover, "when giftedness is denied or ignored, the gifted individual is unable to integrate it into his/her understanding of who he/she is" (Amend & Peters, 2012, p. 594). Risk and protective factors may have multiple and different influences on gifted individuals (Zeidner & Shani-Zinovich, 2011) and this could explain divergent findings that scholars have found on personality traits and psychological domains in literature.

As adults, gifted may face other sociocultural issues which can impact their psychological functioning. For instance, they may struggle to find a job. In literature, this topic is known as "overqualification" (Feldman, 1996; Li & Miller, 2015). This is an umbrella term which refers to people who "occupy positions that significantly exceed educational qualifications needed by the job [i.e., overeducation]. "It is possible to also extrapolate to other qualifications that may exceed job requirements, such as overexperience, overskilling, or overtraining" (Erdogan, Bauer, & Karaeminogullari, 2017, p. 3). Moreover, Fine and Nevo (2008) extended the term to the cognitive overqualification which refers to the "possession of a higher level of cognitive ability than is required for a given job" (p. 346). The imbalance between intellectual skills and the level of mental stimulation given from a job position has negative consequences in personal implications for attitudes and job performance. Fine and Nevo surveyed 156 American call center employers and found that cognitive overqualification correlated strongly with job dissatisfaction and weakly with training performance. In a different research, cognitive overqualification was positively associated with leadership skills assessed by colleagues and training supervisor, but with negative feelings to training programs (Fine, 2007). Hence, high intellectual abilities can represent real obstacles to obtain particular jobs. For instance, in 1999 a man who tried to get on the police forces scored 33 (which corresponds to an IQ of 125) on the Wonderlic Personnel Test and Scholastic Level Exam (WPT, Wonderlic, 2000); his result was considered too high and he was turned down for the job. He sued the Department of Police of the city where he applied querying that it was discrimination against gifted individuals (Jordan v. City of New London and Harrigan, 1999). He lost the case

because the judge stated that "a body of professional literature concludes that hiring overqualified applicants leads to subsequent job dissatisfaction and turnover"[17].

Within the framework of the disharmony hypothesis, Baudson and Ziemes (2016) applied the Cass Identity Model (CIM; Cass, 1979) to gifted individuals' experiences to explain dysfunctional personality traits and emotional vulnerabilities that they may develop (Mönks, 1963). As a minority, people with high intellectual abilities can struggle to create their psychological identity. They may be the target of prejudices, stereotypes, and discriminations. This can increase perceived psychosocial distress and individual vulnerabilities (Meyer, 2003). People who refuse their group identity and what this implies for them – also because they may be not aware of it – are more likely to report psychosocial maladjustments than others. Indeed, how giftedness is integrated with the overall functioning depends on individual's personality, home support, society, and culture (Freeman, 2005). The large variety of definitions of this phenomenon may influence psychological development of gifted people in many ways throughout all life stages and across different countries.

About social stereotypes, teachers play an important role because children spend a fair amount of time with them in school. Recent studies examined teachers' stereotypes about gifted students. When they were asked to rate some vignettes about gifted students, teachers described them as more open-minded, more intelligent, and more involved in scholastic activities; however, at the same time, gifted children were also defined by lower levels of agreeableness, fewer skills in emotional regulation, socially withdrawn, and less motivated in prosocial behaviors (Baudson & Preckel, 2013). Similar results were found with different methodology, such as using the IAT (i.e., Implicit Association Test) (Preckel et al., 2015), and different statistical procedures, such as the latent-class analysis (Baudson, 2016). Since interpersonal reactions influence the identity formation (Ervin & Stryker, 2001), negative stereotypes can impact on others' expectations which in turn can affect negatively psychological adjustments across the lifespan.

Third, about gender differences within the gifted group, women obtained higher scores than men on most of the scales of both questionnaires. Thus, I suggest that gifted men and women may grow up with different vulnerabilities in personality development and psychological maladjustment. In particular, gifted women tended to report greater vulnerabilities in emotions regulation and social isolation domains. The effect sizes were mostly medium or large. They may feel poorer emotional stability, fragmented sense of the Self, and struggle in expressing their emotions (Reis, 2004). The lack of a stable self-representation may be related to emotional instability and maladaptive relational skills. Psychological conflicts between strong needs of others' proximity and the fear to be rejected and abandoned can increase the level of submissiveness or the tendency to be alone and have a withdrawn life-style. By contrast, gifted men tended to report higher psychological dysfunctions in callousness and narcissism Men may be slightly more self-centered and have an egocentric perspective of the world, ignoring others' needs, interests, and worries. For this reason, they may be perceived as adults with poor empathy and little emotional sensitivity.

Many studies have suggested that gifted women and gifted men have different psychological functioning and experiences (Cross et al., 2008; Leder, 2004). Women have been exposed to cultural stereotypes and fixed sex roles (Reis, 2004), and may not have had the chance to be effectively supported during their development, thus decreasing the probability to achieve and express their intellectual potential in adulthood (Kronborg, 2010; Lovecky, 1993). Moreover, Kerr

[17] The Court's Official Ruling is available at http://www.aele.org/apa/jordan-newlondon.html

(1997) pointed out that gifted girls' results on standardized measures (e.g., intelligence, achievement, or aptitude tests) administered in childhood are not a good predictor of life outcomes in adulthood. Gifted women have often negative feelings about themselves; for instance, they may experience the "imposter syndrome" which refers to the tendency not to attribute personal attainments to one's abilities but to external events, luck, or by chance. For this reason, personal achievements are often perceived as undeserved (Reis, 2004).

Many factors may affect gifted women's job careers: the relative importance given to family vs. work, partner's career, job prospects in her area, the attitude of her partner to help with housework and children, and reciprocal support. Other difficulties involved socio-economic status, familiar roles or principles, personality characteristics, low level of education, absence of mentors and examples to follow, and lack of good interpersonal relationships (Kitano & Perkins, 1996).

However, findings on gender differences must be interpreted carefully because the number of gifted women in this study was small ($N = 15$). In the first chapter, I have already presented multiple hypotheses that have been suggested in order to explain the uneven number of gifted women in most of the studies (§ 1.4) (Abad et al., 2004; Deary et al., 2007; Deary et al., 2003; Faria & Fontaine, 1997; Furnham, 2001; Furnham & Gasson, 1998; Lang et al., 2017; Shields, 1982; Strand et al., 2006).

2.7 Limitations and Future Directions

In conclusion, I will briefly point out some limitations of this study and hence I will propose some additional researches in this area.

First, no empirical studies have confirmed DAPP-BQ four-cluster structure (Livesley & Jackson, 2009). Although this questionnaire has shown its utility in clinical settings (Verheul, 2005), four personality domains do not provide a good measure of fit and they consist of an irregular number of sub-traits. For instance, Compulsivity is both a subscale and a whole cluster, whereas Emotion Dysregulation consists of seven different scales; thus, I suggest interpreting cluster scores carefully because they can be measures of narrow or very broad personality domains. Moreover, the DAPP-BQ contains only one validity scale that was designed to measure social desirability, whereas other clinical instruments (e.g., Personality Assessment Inventory, Morey, 2007; Minnesota Multiphasic Personality Inventory 2 – Restructured Form, Ben-Porath & Tellegen, 2008) have multiple validity scales. Interpreting questionnaire scores is always a product of *what* the examinee reports (i.e., clinical scales) and *how* the examinee expresses those symptoms (i.e., validity scales). Thus, if an instrument has one validity scale, scholars and clinicians may struggle to trust examinee's level of over- or under-reporting. Future studies could consider the administration both the DAPP-BQ and the NEO-PI-R, so that results could be directly comparable to previous researches and convergence across multiple instruments can enforce our knowledge on this topic.

Second, the gifted group was composed of Mensa members only. Although they were selected based on their results on the WAIS-IV, they could represent one specific kind of giftedness. Personality functioning of gifted people who are selected based on their scholastic or job achievements may be dissimilar. For this reason, I would like to stress that these results cannot be generalized to all gifted adults. However, it is interesting noticing that some domains (i.e., Antagonism) have shown similar results across different questionnaires and different sampling method. I think future studies should consider different gifted groups, such as Mensa members,

adults who were identified as gifted when they were in school, twice-exceptional, etc. Examining similarities and dissimilarities among different gifted groups may help scholars to improve scientific knowledge about complex relationships among intelligence, personality and variables that mediate, moderate or influence these psychological aspects across individual development.

Third, the main aim of this chapter was to compare gifted and nongifted personality functioning. However, this represents a starting point to examine these characteristics more deeply. In fact, after finding relevant differences between two groups, more complex models can be created and more sophisticated statistical analyses should be performed. For instance, multiple regression models may explain the role of intellectual abilities, gender, and perceived support on dysfunctional personality traits.

CHAPTER 3. EMOTIONAL INTELLIGENCE AND INTELLECTUAL GIFTEDNESS

3.1 Emotional Intelligence: Cognitive Ability or Personality Traits?

3.1.1 Historical Introduction: From Social Intelligence to Emotional Intelligence

Emotional Intelligence (EI) has been one of the most controversial constructs in psychology over the last three decades. Different authors have given different definitions, and they have alternatively measured EI as an intellectual ability or as a set of characteristics related to the personality functioning. Despite different models have been proposed, it is still unclear whether EI is something that psychologists already knew called with an appealing label or it is something completely new (Matthews, Zeidner, & Robert, 2004). This debate should not surprise because definitions of psychological constructs are often products of long-term discussions; for instance, it took a long time to find a conclusive taxonomy of components of "stress", "intelligence", or "personality" (Van Rooy & Viswesvaran, 2004) and there is still a large disagreement on their definitions.

Salovey and Mayer (1990) are typically identified as the authors who coined the term of EI. However, other scholars have examined analogous constructs that shared great overlaps with it. In the modern era, Thorndike (1920) suggested the idea of "social intelligence" (SI) which can be considered a precursor of EI. In his framework, intellectual abilities are related to objects (i.e., mechanical intelligence), ideas (i.e., academic intelligence) and people (i.e., social intelligence). SI was "the ability to understand and manage men and women, boys and girls, and to act wisely in human relations" (p. 228). Thus, his definition of SI consists of two components, both cognitive (i.e., understanding) and behavioral (i.e., acting wisely). A similar definition was provided by Vernon (1933). Other definitions have focused on one of the two features only. Although Thorndike's concept of SI created on theoretical conjectures, his contribution stimulated new research in this area. Unfortunately, decades of work have been quite unproductive.

The George Washington Test of Social Intelligence (Hunt, 1928) was the first test to measure SI; however, the validation process showed that it was difficult to distinguish between verbal abilities and SI and its predictive utility was extremely limited (Landy, 2006). Guilford's work (1967; Guilford & Hoepfner, 1971) was also relevant. His Structural Model describes intelligence as composed of operations, contents, and products: the component of operations refers to intellectual requirements to solve tasks, the content is the properties of task material, and the product refers to the type of outcome. The combination of different elements of these components results in 120 intellectual abilities. In particular, the *behavioral content* facet represents the construct of SI. O'Sullivan and Guilford (1966, 1976) created two test publications to measure the cognitive domain of SI and these tasks consisted mostly of pictures; in addition, Hendricks and colleagues (1969) built tests to assess the divergent (or "creative") component of SI. They defined that as the ability to express internal mental states, to create categories of behavioral actions, to act fully in tune and maintain the correct sequence of interactions with other's behaviors, to alter a sequence of expressions and to predict possible outcomes.

Matthews and colleagues (2004) have summarized three main components of SI:

1. Social sensitivity, social insight, and communication (Greenspan, 1989).

2. Prosocial behavior, empathy, relational skills, emotionality, social anxiety management (Marlowe, 1986).
3. Understanding people, being warm and open to new experiences, knowledge of social norms, and social adaptability (Kosmitzki & John, 1993).

Based on this perspective, EI can be described as a subset of SI (Salovey & Mayer, 1990). While some scholars have struggled to discriminate SI from general intellectual ability (i.e., IQ, GMA, etc.), EI seems different from other constructs already examined in the literature (Neubauer & Freudenthaler, 2005).

In addition, alternative models of EI as a set of personality traits have been proposed (Bar-On, 1997; Goleman, 1995; Petrides, 2009). When Goleman (1995) published his best-seller *Emotional Intelligence: Why It Can Matter More Than IQ*, EI became extremely popular. Although his work consisted of many assumptions not empirically supported, it has encouraged to examine this construct more deeply. Baron-On (1997) and Petrides (2009) suggested mixed models of EI. In their perspective, EI incorporates a wide range of personality traits and sub-traits and it should be measured through self-report questionnaires. The term "mixed model" refers to individual differences in behaviors and experiences, including "motivations, interpersonal and intrapersonal abilities, empathy, personality factors and well-being" (Gutiérrez-Cobo, Cabello, & Fernández-Berrocal, 2017).

3.1.2 Two Models of Emotional Intelligence

Emotion and cognition have been conceptualized as separate notions for a long time. Emotions were seen as primitive mechanisms, while intellectual abilities as the most advanced aspect of human being (Ekman & Davidson, 1994). Currently, cognitive psychologists and neuroscientists show that the relationship between these two aspects is more complex, bidirectional and interactive. These two systems are interdependent from one another (LeDoux & Brown, 2017; Panksepp, 2010; Phelps, Lempert, & Sokol-Hessner, 2014). For example, Schwarz and colleagues (1991) studied how information processing changes in different emotional states: they showed that negative states will promote deep and detailed analysis before making a decision, whereas positive states will lead to more spontaneous and original approaches.

Emotional Intelligence was a new attempt to link these two concepts. In particular, Salovey and Mayer (1990) defined EI as the "ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (p. 189). Interest in emotional intelligence has led to benefits and disadvantages. Many scholars have studied this new construct, improving models and measures. However, empirical results have been often ambiguous because of lack of systematic and methodical research in this field.

In general, EI has been described following two main perspectives. Each of them has developed a theoretical background and tools for psychological assessment.

EI as a cognitive ability. Mayer, Salovey, and Caruso (2002) have suggested the Four Branch Hierarchical Model. They defined EI as an intellectual ability, composed of four different narrow abilities: (a) Emotion Perception (i.e., ability to perceive and recognize discrete emotional states from facial expressions); (b) Emotion Facilitation of Thought (i.e., ability to generate emotional states to facilitate performance on other cognitive tasks); (c) Emotion Understanding (i.e., ability to understand how emotions change over the time, combine and transform over different situations);

(d) Emotion Management (i.e., ability to find out the best solution to regulate or manage one's own and other's emotions). The first two branches can be grouped in the Experiential component of EI; this area is defined as the ability to perceive, answer, and employ emotional information without necessarily comprehending the meaning. Emotion Understanding and Management constitute the ability to understand and control emotions without necessarily having experience of feelings of emotion and constitute the Strategic component of EI.

Although Mayer and colleagues have supported the view of EI as cognitive ability, they also distinguish between "cold" (or "cool"; Schneider, Mayer, & Newman, 2016) and "hot" intelligence. "Cool intelligence" refers to abilities involving "relatively neutral and impersonal information" (*low self-involvement*) (Mayer, Panter, & Caruso, 2012). For instance, people usually agree on which characteristics are associated with specific words (e.g., the dog is an *animal*, a *mammal*, and *barks*); or people who try to solve a visual puzzle can recognize when someone obtains the right solution. On the other side, "hot intelligence" refers to a set of abilities which involve "highly charged and personally significant information" (e.g., emotions, personality, social relations) (Schneider et al., 2016). Thus, EI belongs to the category of *hot* intelligence.

Mayer and colleagues (1999) supported that EI is a cognitive ability, showing that it meets three main criteria of validity:

1. Conceptual: an intelligence must be an indicator of cognitive performances rather than reflecting behavioral preferences or non-intellective factors (i.e., motivation, self-esteem, social desirability, etc.). The four EI abilities are hierarchically (i.e., latent variable model; Borsboom, 2008; Joseph & Newman, 2010), or causally structured (Schneider et al., 2016). In the first case, EI is "simply" the shared variance across different low-level abilities; in the second case, EI is the system in which narrow abilities would causally influence one another. Moreover, scoring method of test determines if there are right and wrong answers. The MSCEIT scores can be alternatively computed on experts' consensus (i.e., members of the International Society for Research on Emotions) or based on the standardization sample's answers.

2. Correlational: emotion-related abilities should show a moderate degree of correlation with one another. The same logic has been applied to intelligence tests; different narrow aspects of the same broad ability should correlate one another more than the correlation between each of them and measures associated with different broad abilities. Kong (2014) conducted a meta-analysis on the relationship between MSCEIT and other intellectual abilities: he found that emotional abilities show low correlations with verbal (r = .26) and nonverbal (r = .27) intelligence. However, correlations among MSCEIT tasks are not homogeneously high (Rossen, Kranzler, & Algina, 2008).

3. Developmental: emotional intelligence, like other cognitive abilities, should develop with age and life experiences, from childhood to adulthood. Zeidner and colleagues (2003) suggested the Investment Model of Emotional Competence; emotional and other intellectual abilities may be more related to verbal skills during childhood, which may represent a constraint during one's development (see Investment Theory; Cattell, 1963). Thus, children's verbal abilities may help to learn rules about which emotions and feelings can be displayed in social environment. In late childhood and adolescence, metacognitive abilities become more important because they might support intuition about self and others' psychological functioning (Matthews, Lin, Zeidner, & Roberts, 2017).

EI as personality traits. Petrides (2009) have described EI as a set of characteristics related to the personality functioning. Emotional Intelligence would be a multicomponent construct and it is composed of 15 sub-traits (Table 3.1), grouped into 4 broader factors: (a) Well-Being (i.e., feelings of happy and pleasure from own life experience, past, present, and future); (b) Self-Control (i.e., degree at regulating stress and pressures and in controlling impulses); (c) Emotionality (i.e., capabilities related to emotions, i.e., perceiving and expressing emotions and developing close relationships with others); (d) Sociability (i.e., relational capabilities used in different social contexts and aptitude in socializing with people from different backgrounds).

Table 3.1 Petrides' Traits Emotional Intelligence Model

Broad Factor	Sub-Trait	Description
Well-Being	*Trait Happiness*	Pleasant emotional states, mainly directed toward the present.
	Trait Optimism	Positive expectations toward the future.
	Self-Esteem	Overall evaluation of self and own achievements.
Self-Control	*Emotion Regulation*	Control over own feelings and emotional states in short, medium or long-term, and ability to change negative mood through personal effort or insight.
	Low Impulsivity	Before making a decision, all the information is considered carefully and without losing self-control.
	Stress Management	Effective coping mechanisms to handle pressure and stress.
Emotionality	*Trait Empathy*	Capability to take others' perspective, understand their needs and desires, and see the world from their point of view.
	Emotion Perception	Capability to decode own and other people's emotional expressions.
	Emotion Expression	Capability to express own feelings and emotions to others accurately and with no ambiguities.
	Relationships	Capability to start and maintain emotional bonds with other people (i.e., family members, partner, and friends); relationships influence positively the quality of life in terms of productivity and emotional well-being.
Sociability	*Emotion Management*	Capability to manage and influence *other people*'s emotional states (i.e., calming down, consoling, motivating) to make them feel better.
	Assertiveness	Knowledge of how to ask for things, give and receive compliments and – if necessary – confront others; leadership skills and attention for own rights and beliefs.
	Social Awareness	High social capabilities, socially perceptive, flexible, and sensitive; good capabilities at influencing others and negotiating; self-confidence in own controlling over emotions and in own functioning in different social environments (e.g., work, parties, etc.).
Independent Facets	*Adaptability*	Flexibility in own approach to life and work; new environments and conditions are not problematic; pleasure for novelties and regular changes.
	Self-Motivation	Need to produce high-quality work; determination and dedication; absence of need if external reward to reach achievements; internal locus of control.

Reuven Bar-On's EQ model (1997) has been considered the first mixed-model of EI and an important precursor of Petrides' model. In this model, EI consists of abilities and personality characteristics that allow expressing emotional intelligence. It has a hierarchical structure; sets of sub-traits are grouped in five higher-level dimensions: (1) Intrapersonal EQ (e.g., emotional self-awareness and assertiveness); (2) Interpersonal EQ (e.g., empathy and interpersonal relationships); (3) Stress Management (e.g., stress tolerance and impulse control); (4) Adaptability (e.g., flexibility and problem solving); (5) General Mood, (e.g., optimism and happiness). Despite the similarities between the two models, Petrides has been the first author to explicitly refuse to interpret EI scores as ability, competencies, or skills. Within his theoretical background, trait EI (or "trait emotional self-efficacy") refers to "a constellation of emotional self-perceptions located at the lower levels of personality hierarchies" (Petrides, 2010, p. 137). Thus, trait EI measures how people tend to perceive their own emotional abilities (*subjectivity of emotional experience*). This model has been supported by empirical studies that have showed the relationships between trait emotional intelligence and personality measures were statistically higher than the correlations with intellectual abilities (van der Linden, Pekaar, Bakker, Schermer, Vernon, Dunkel, & Petrides, 2017; Vernon, Villani, Schermer, & Petrides, 2008).

Petrides and colleagues (2016) stated three main characteristics of their conception of EI:

1. There is no universal correlation between trait EI measures and psychological adaptability; this means that higher trait EI is not necessarily an indicator of good flexibility. Indeed, context and situational factors may play an important role in determining whether trait EI is related to positive or negative outcomes (Davis & Nichols, 2016). For instance, empirical studies have found positive correlation between trait EI and Narcissism (Petrides, Vernon, Schermer, & Veselka, 2011; Zhang et al., 2015).

2. Different environmental contexts (scholastic/academic, health, and occupational) may trigger negative or positive expressions of the same emotional intelligence traits (Davis & Nichols, 2016). For example, low emotional regulation and understanding, and high awareness are related to individual sub-clinical symptoms (Gohm, Corser, & Dalsky, 2005; Extremera & Fernandez-Berrocal, 2006); positive outcomes correlate with better balance among EI facets.

3. Trait EI self-perceptions are assumed to be stable during adulthood (Petrides, Furnham, & Mavroveli, 2007).

3.1.3 Convergence between Ability EI and Trait EI

Little agreement across tests of different EI conceptualizations has been well-documented (Bornstein, 2007). Many characteristics distinguish performance-based tests and self-attribution questionnaires (Wilhelm, 2005). The aim of performance-based tests (e.g., MSCEIT) is to measure the maximal extension of people's abilities achievements, or declarative knowledge; test-takers need to put mental or physical effort to solve tasks and their scores are minimally influenced by response bias; they evaluate performances scored on external criteria. Conversely, the aim of self-attribution questionnaires is to measure typical behaviors, asking to estimate how well an item describes psychological experiences, preferences, behavioral tendencies; typically, self-report measures require less effort than performance-based tasks and they are more likely to be affected by response biases (e.g., social desirability, positive or negative impression management, etc.).

Although there has been a large debate about the utility of EI as intellectual ability vs set of personality traits, few empirical studies have examined the convergent validity between Four Branch Hierarchical Model (Mayer et al., 2016) and Trait EI Model (Petrides et al., 2007). Despite both models represent an attempt to operationalize the construct of EI, scholars have found small or nonsignificant correlations between MSCEIT and TEIQue scores; the pattern of results across their scales is inconsistent (Karim & Weisz, 2010; Di Fabio, Saklofske, & Tremblay, 2016). Thus, they seem to confirm that these measures assess different aspects of psychological functioning (Pérez, Petrides, & Furnham, 2005). Moreover, when interpreting the relationships between these two tests, it should be considered that MSCEIT tasks have different structures, involve a different kind of stimuli (i.e., pictures or situations) and scoring methods (i.e., multiple choices or rating scales); these aspects could have different effects on each TEIQue scale.

Other studies have inspected the convergence between the MSCEIT and other self-report measures, e.g. Emotional Quotient Inventory (EQ-i; Bar-On, 1997), displaying low correlations (between .12 and .21) (Brackett & Mayer, 2003; Mayer et al., 2002). In addition, little convergence occurs between maximal and typical performance measures designed to evaluate the same construct; for instance, in their assessment of the convergence between MSCEIT and SSRI (Self-Report EI Test, Schutte, Malouff, Hall, …, & Dornheim, 1998), Brackett and Mayer (2003) found only a small correlation (r = .18) between the two tests, despite the common theoretical background.

3.2 The Role of Emotional Intelligence in Clinical Psychology

Lately, EI has gained large interest because the scientific community wants to understand whether it is a new and useful predictor of quality of life, educational achievements, and occupational success. Indeed, there is still no agreement about if EI constitutes a different entity from what it is already known in the field of intelligence, personality, and individual differences. Thus, since the theoretical frameworks of EI are now largely widespread, clinical studies have been extensively conducted (Hansenne, 2012). In the next paragraphs, I will review the main results about the relationships between EI and *traditional* intelligence, and personality.

3.2.1 Emotional Intelligence and CHC Theory of Intelligence

Mayer and colleagues (2016) stated that EI could be conceptualized as a "broad" ability in the Cattell–Horn–Carroll model of intelligence (McGrew, 2009; see also §1.1.1). Schneider and McGrew (2018) have claimed that the narrow ability of Knowledge of Behavioral Content (*BC*) can be considered similar to intellectual components of emotional intelligence. This ability has been already included in the CHC model even though its relevance may have been largely underestimated. *BC* refers to "knowledge or sensitivity to nonverbal human communication/interaction systems (e.g., facial expressions and gestures)" (p. 124). So far, MacCann, Joseph, Newman, and Roberts (2014) have conducted the most important study in this area. They administered to 700 students a wide set of intelligence tasks, including the MSCEIT to assess emotional intelligence abilities. Their factor analysis confirmed that EI may be a new broad intelligence within the second-stratum of the CHC model. They confirmed three out of the four original narrow abilities suggested by Mayer and colleagues (1997, 2002, 2016). Moreover, Kong (2014) speculated that EI may involve two components: (a) verbal abilities that are related to crystallized knowledge about emotions (e.g., "knowing whether an emotion regulation strategy is effective", Côté, 2010, p. 129); and (b) fluid abilities (mainly nonverbal) that support reasoning and problem solving (e.g., "implementing that strategy effectively in a real, emotionally evocative

situation", Côté, 2010, p. 129). Thus, ability-based EI should show substantial correlations with both verbal and nonverbal abilities.

The four abilities described within Mayer and colleagues' model may support social interactions; indeed, emotions can assist communicative and relational functions, involving information about others' thoughts and motivations, and regulating social relationships (Keltner & Haidt, 2001). I will review each component of their EI model, stressing their relationships with other psychological or behavioral variables (Feldman Barrett, Salovey, & Mayer, 2002; Salovey & Pizarro, 2003):

1. Emotion Perception: Ekman's studies on facial expressions are well-known and certainly represent one of the most productive research areas in psychology (Ekman, Friesen, & Ellsworth, 1972). Facial expression is the most important component of the nonverbal channel of communication and the ability to perceive emotions correctly gives important clues to interpret others' internal feelings and emotional states. For this reason, the recognition of emotion in others plays a central role to develop empathy and understand others' reactions and behaviors (Banziger, Grandjean, & Scherer, 2009; Besel & Yuille, 2010). Thus, this ability becomes relevant to maintain social interactions with peers, close romantic relationships, and in other contexts (e.g., negotiations). For instance, perceiving other's sadness gives relevant information about which behavioral strategy should be preferred to interact with that person (Gohm et al., 2005). However, many other variables may influence the use of this competence in everyday life (e.g., others' expressions are explicit or need to be interpreted, familiarity with who is displaying specific emotions, the extension of attention and the degree of motivation involved, the number of contextual clues, etc.). Matsumoto and colleagues (2000) found that Big Five personality traits were correlated with facial emotional recognition tasks (in particular, Openness, Conscientiousness, and Extraversion positively, and Neuroticism negatively). Taken together, these outcomes suggest that people who are more disposed to join social interactions may be more capable to recognize others' emotional expressions.

2. Emotion Facilitation of Thought: although the Branch Hierarchical Model has composed of four factors (Mayer, Salovey, Caruso, & Sitarenios, 2003), empirical studies have not always confirmed this structure. Indeed, Facilitating Emotions (MacCann et al., 2014) often does not emerge as an independent dimension. However, interpreting the factor within this theoretical framework, it refers to the ability to consider feelings and emotions to focus attention and think more rationally. On one hand, cognition can be disturbed by negative emotions (such as rage, sadness, or anxiety); on the other hand, emotions can be used productively, directing the cognitive system towards salient features and contributing to match tasks and mood (Palfai & Salovey, 1993; Simon, 1982). For instance, sad moods are related to careful and methodical style of thinking, while happy moods tend to promote more heuristic, creative and exploratory style of thinking (Forgas, 1995). Schwartz and colleagues (1991) suggested that emotions can influence information processing claiming the role of individual motivation: if positive emotions are involved, there is no reason to elicit defense mechanisms, nor mental or physical; otherwise, if negative affects indicate a dangerous situation, the cognitive system could prefer processing information that re-establishes psychological well-being. In addition, Hogeveen, Salvi, and Grafman (2016) suggested that "emotional memory" (i.e., conscious memory for experiences that aroused an emotional reaction, Kensinger & Murray, 2012) may be considered as a sub-component of this ability. Indeed, human beings have a better memory for emotional episodes than neutral

ones, and emotional memories are consistently less likely to be forgotten over the time (Yonelinas & Ritchey, 2015).

3. Emotion Understanding: this factor refers to the ability to label emotions and recognize that set of emotions can be grouped in families or that some emotions are more related to certain clusters than to others (Ortony, Clore, & Collins, 1988). Moreover, it also refers to the knowledge of how emotions can be combined and how they can change over the time. This factor has invariably shown the highest correlations with the other intellectual abilities, in particular with crystallized intelligence (Farrelly & Austin, 2007). The Theory of Mind (ToM) has been described as a precursor of understanding emotions (Astington, Harris, & Olson, 1988; Denham & Kochanoff, 2002). The ability to infer mental states in others and to interpret them as the cause for actions plays a central role in the acquisition of emotion knowledge and it allows more sophisticated social interactions. Halberstadt and colleagues (2001) suggested the Model of Affective Social Competence which conceptualizes the understanding of emotions as an outcome of a correct appraisal and interpretation of emotion perception. Following a developmental view, children learn to label feelings and emotional states both verbally and non-verbally; then they learn to identify which situations elicit specific emotions and infer their causes and consequences. It may represent a mediator between emotion recognition and self and other's emotional regulation (Schneider et al., 2016). Indeed, understanding thoughts, feelings, and actions could allow influencing actively self and others' internal states and behaviors.

4. Emotion Management (or "Emotion Regulation", Lopes, Salovey, Côté, Beers, & Petty, 2005): this factor refers to the ability to modulate self and others' emotional experiences to reach adaptive affective states and outcomes (Gross & John, 2003). It may be considered the most significant skill for social relations because it could mediate the effect of understanding emotions on subsequent thoughts and actions (Lopes et al., 2005; Schneider et al., 2016). Emotion regulation can affect interpersonal relationships in many ways; its influence makes social interactions more positively salient and elicits enthusiastic reactions from others. Conversely, the expression of emotions out of control often makes others move away (Furr & Funder, 1998). Moreover, successful emotion management is related to positive social interactions (Cunningham, 1988), effective strategies in social contexts (Langston & Cantor, 1989), deliberate and flexible use of attentional resources, and it allows to make good decisions even under pressure and stress (Lopes et al., 2005). The positive influence of emotion regulation on social interactions have been confirmed in childhood and in adulthood. Children with higher emotion regulation skills tend to have a better quality of relational functioning (Eisenberg, Fabes, Guthrie, & Reiser, 2000). In two different studies, young adults with higher abilities in emotion regulation showed better social relationships; less conflicts and disagreements with friends; and peaceful, supportive, and mature interactions with their parents (Lopes, Salovey, & Straus, 2003; Lopes et al., 2005). These outcomes remained statistically significant after removing the effects of crystallized and fluid intelligence and personality traits (Lopes et al., 2005).

Finally, the distinction between intelligence and behaviors should be discussed (Gohm et al., 2005; Mayer et al., 2016). Although intelligence test scores are related with many life outcomes, higher test scores are not necessarily an indicator of a better overall psychological functioning; even extremely smart people may "make poor decisions or careless mistakes" (Stanovich, 2009, p. 11). Thus, individual behaviors are imperfect predictors because of the influence of many other variables

(e.g., personality, and social factors) (Funder, 2001; Mischel, 2009). Indeed, one's behavior is a combination of different aspects in a particular context (Mischel, 2009). These aspects include motivations, emotions, social and cognitive styles, self-awareness, and self-control, and influence behaviors, such as performances in intelligence tests. Correlations between the Big Five personality traits and general intelligence are small and inconsistently significant (Ackerman & Heggestad, 1997). Similar results were found between the Big Five scale scores and emotional intelligence; EI showed small correlations with neuroticism (r = -.17), openness (r = .18), extraversion (r = .12), conscientiousness (r = .15), and agreeableness (r = .25) (DeYoung, 2011; Joseph & Newman, 2010). These results confirmed the relative independence of EI from personality and suggested that many people who are emotionally stable and conscientious might obtain average scores in EI ability tasks. In addition, at group level, highly emotional intelligence people tend to have better outcomes than other people, in terms of interpersonal relationships, life satisfaction and job carrier (Fernández-Berrocal & Extremera, 2016; Karim & Weisz, 2010; Nathanson, Rivers, Flynn, & Brackett, 2016; Rossen & Kranzler, 2009).

3.2.2 Emotional Intelligence, Personality, and Psychopathology: new bottles for old wine?

Trait EI is a constellation of emotion-related self-perceptions placed at the lower levels of hierarchical models of personality (Petrides et al., 2007). In other words, emotional intelligence as a set of traits and sub-traits refers to self-perceptions of emotional abilities. It considers several affective aspects of personality and is located outside the CHC Theory of Intelligence. A growing number of empirical studies has found significant relationships between trait emotional self-efficacy and many constructs usually examined in the field of individual differences (Petrides et al., 2011), such as addictive disorders (Kun & Demetrovics, 2010; Uva, de Timary, Cortesi, Mikolajczak, du Roy de Blicquy, & Luminet, 2010), alexithymia (Austin, Saklofske, & Egan, 2005; Parker, Taylor, & Bagby, 2001) leadership self-efficacy (Villanueva & Sánchez, 2007), adaptive sense of humor (Vernon et al., 2009), activation of frontal areas (Mikolajczak, Bodarwe, Laloyaux, Hansenne, & Nelis, 2010), reaction times in intellectual tests (Austin, 2009), psychopathology across transitions in school (Williams, Daleya, Burnsideb, & Hammond-Rowleyc 2010), and relational satisfaction (Smith, Heaven, & Ciarrochi, 2008). In addition, EI showed statistically significant associations with general health, socioemotional adjustment, and life satisfaction (Johnson, Batey, & Holdsworth, 2009; Petrides et al., 2007).

The debate about the status of trait emotional intelligence has not been solved since this construct was proposed in the 90s (Schulte, Ree, & Carretta, 2004). It is still not clear whether EI is a set of personality traits that have been already identified under different labels. P. Vernon and colleagues (2008) administered TEIQue and NEO-PI-R (Costa & McCrae, 1992) to a sample of 632 adults in order to examine the overlap among constructs of the two models. Results showed medium and large correlations between personality traits and three out of four EI factors. In particular, neuroticism showed negative and strong correlations with psychological well-being (r = .60) and self-control (r = .74). Other meaningful relationships linked extraversion to well-being (r = .49) and sociability (r = .57), and conscientiousness to self-control (r = .48). Similar findings were found in other studies (Freudenthaler, Neubauer, Gabler, & Scherl, 2008; Greven, Chamorro-Premuzic, Arteche, & Furnham, 2008; Petrides et al., 2010). Thus, the similarities between trait EI and the five-factor model of personality affect the interpretation of emotional intelligence as an independent construct. Petrides and colleagues (2007) have reviewed empirical studies in which scholars used multiple regression techniques to evaluate the amount of variance of EI can be explained by personality traits. They found that the same five higher-order factors explain 50-80%

of TEIQue scales. However, the overlap seems to affect the four EI traits differently; well-being (between .25 and .60) and self-control (between .01 and .74) show strong correlations with personality traits, while smaller coefficients are associated with emotionality (between .18 and .31). These findings suggest that "emotionality" should be interpreted as a distinct dimension and it cannot assimilate to any aspects described in the five-factor model. This facet does not indicate the intensity of emotional experience which can be related to neuroticism and extraversion for negative and positive emotions, respectively (Matthews, Zeidner, & Roberts, 2012). Otherwise, the four scales associated with emotionality measure how people evaluate their own capabilities of perceiving, understanding, and sharing emotions in social contexts. This set of capabilities is quite different from personality traits measured by the FFM.

Recently, Andrei and colleagues (2016) conducted a systematic review and a meta-analysis of the literature in order to examine the incremental validity[18] of the TEIQue. Results indicated that EI traits consistently explained additional variance for different domains of psychological functioning, beyond higher-order personality facets and other emotional measures. The pooled effect size was small but statistically significant. Another recent line of empirical studies has inspected the location of trait EI in personality factor space. Van der Linden and colleagues (2016) conducted a meta-analysis, extracting the General Factor of Personality (GFP) from the five-factor model and examining its associations with EI questionnaires. Two important results emerged from this study: first, GFP showed a large overlap with trait EI ($r \approx .85$); second, there was a positive, although weak, correlation between GFP and ability EI ($r \approx .28$). These findings suggested that GFP could be interpreted as "socioemotional effectiveness" factor which is very similar to trait EI. Moreover, in terms of individual differences, individuals with high GFP tend to have a higher score on trait and ability EI.

Besides studies on trait EI and personality facets, scholars have also examined the relationships between EI and clinical disorders (in particular, depression and anxiety) (Hansen, Lloyd, & Stough, 2009; Hansenne, 2012). Higher-level of emotional self-efficacy could be a protective factor for psychological disorders, considering its associations with well-being, optimism, and happiness (Furnham & Petrides, 2003; Schmidt & Andrykowsky, 2004). Concerning mood-related disorders, depressed individuals could be less capable to express and experience emotions and to manage strategies to recover from negative mood and emotional states; thus, they may have lower scores on EI measures. Dawda and Hart (2000) found that EQ–i was negatively correlated with the Beck Depression Inventory (BDI); in particular, Intrapersonal EQ scores (i.e., emotional self-awareness and assertiveness) showed the stronger association in both men ($r = -.57$) and women ($r = -.62$). Ciarrochi, Deane, and Anderson (2002) showed that individuals that can influence positively others' emotions tend to report less suicidal ideation, less negative emotions when they face stressful events, less depressive mood, and less hopelessness; they exhibit more prone to understand others' feelings and tune in with them; and they have better support from their friends and family which decreases the intensity of negative feelings. Hansenne and Bianchi (2009) compared also EI scores of 54 patients with major depressive disorder (without any comorbidities) to a control group. Results showed that depressed individuals considered themselves to be more pessimistic, have less adequate emotion regulation strategies, and be less capable to recognize others' emotions. Summarizing empirical findings on depressive mood and EI, they have suggested that emotional

[18] This term refers to the degree to which a new clinical instrument "provides measures that are more valid than alternative measures of the same variables" (Haynes & Lench, 2003, p. 456). In other words, if a new test does not provide any additional information than others, then it is redundant and does not need to be used.

regulation could be "the core feature of the association between EI and depression" (p. 64). About anxiety-related disorders, some scholars have found associations between EI and generalized anxiety disorder (GAD). People who exhibit internalizing and anxiety symptoms tend to replace emotional processing of the events with psychological worries in order to avoid overwhelming and intense emotions; their disorder may be related to a deficit of emotional regulation (Hansenne, 2012). Mennin and colleagues (2005) showed that individuals with GAD experienced more intense negative emotions than a control group; however, they did not display the same difference for positive emotions and they referred to be less capable to perceive, describe and regulate their negative emotional states. Similar results have been consistently found (Novick-Kline, Turk, Mennin, Hoyt, & Gallager, 2005; Turk, Heimberg, Luterek, Mennin, & Fresco, 2005). In addition, authors have examined relationships between EI and other anxiety-related disorders. Hofman and colleagues (2017) investigated the protective role of EI on Post-Traumatic Stress Disorder (PTSD) symptoms. 443 trauma-exposed young adults were involved in their study. They found that EI correlates significantly with post-traumatic stress symptoms; this association was still significant after considering the mediating role of social support. Furthermore, Nolindin (2006) studied the relationship between social anxiety and EI in a clinical sample. People who suffered of social anxiety tend to score lower on emotional recognition and expression, understanding emotions, emotion management, and emotion control, compared to a control group; in the clinical group, emotional control predicted social interaction anxiety after removing the effect of depression and general anxiety. This domain reflects the loss of control on the intensity of emotions and its impact on one's overall psychological functioning. Other studies have found relationships between EI and substance abuse (Riley & Schutte, 2003), eating disorders (Kucharska-Pietura, Nikolaou, Masiak, & Treasure, 2003), compulsive gambling (Kaur, Schutte, & Thorsteinsson, 2006), and Asperger syndrome (Petrides, Hudry, Michalaria, Swami, & Sevdalis, 2011).

Finally, a growing number of studies has analyzed the "dark side" of EI (Austin, Farrelly, Black, & Moore, 2007; Nagler, Reiter, Furtner, & Rauthmann, 2014). Austin and colleagues (2007) suggested that emotional manipulation of others may represent one potential "dark side" of EI. For instance, people with narcissistic or sociopathic personality traits may use their high EI to regulate others' emotions in order to obtain personal advantages and reach their own goals. Indeed, EI may be "simply" an indicator of one's capability of processing emotional information; high levels of EI are not necessarily related to voluntary behaviors to benefit others (Nozaki & Koyasu, 2013). From a philosophical perspective, Carr (2000) supported the idea that high EI may be related to negative aspects. He claimed that EI is "dependent on the moral end which it serves" (p. 31). For this reason, it is hard to distinguish between EI, emotional cleverness, and cunning. Although this point of view is interesting and clinically relevant, other studies are needed to confirm or argue against it.

3.2.3 Limitations of the Current Conception of Emotional Intelligence

Research on emotional intelligence is just at the beginning. In this paragraph, I will briefly review the main issues associated with both ability and trait EI models and their tests. Indeed, model limitations may affect test results and the relationships between them and everyday life skills or tendencies.

Concerning the Four Branch Hierarchical Model, Wilhelm (2005) suggested three important limits. First, the role of verbal abilities. Some studies found moderate correlations between ability EI and crystallized intelligence (r = .56, Bastian, Burns, & Nettelbeck, 2005; r = .57, Lumley, Gustavson, Partridge, & Labouvie-Vief, 2005). However, the magnitude of these relations should be interpreted

as a limitation of MSCEIT tasks rather than a broader inconsistency of conception of EI. Indeed, correlation coefficients vary depending on the material used to assess different components of emotional intelligence. For this reason, the use of alternative instruments may give more reliable measures. For instance, the Multimedia Emotion Management Assessment (MEMA, MacCann, Lievens, Libbrecht, & Roberts, 2016) has been created to assess same abilities of the MSCEIT, using audio-video rather than written stimuli. This may decrease the influence of verbal abilities on EI tasks. Second, arbitrariness of the operationalization of constructs included in the model. For example, emotional recognition is measured by visual face expression; however, this ability involves many other sensorial modalities (e.g., facial patterns, the tone of voice, global body movements). Several instruments have been created to fill this gap (e.g., MERT, Banziger et al., 2009; DANVA2-POS, Pitterman & Nowicki, 2004). Third, lack of associations with a broader theoretical background that refers to massive literature on emotions. The model and EI measures should be shaped by experimental and neuropsychological findings in order to maintain a strong association with general theories of emotions (e.g., Izard, 2009). Theoretical and empirical cascading models have been suggested to interpret individual performances retrospectively (Joseph & Newman, 2010; Schneider et al., 2016).

Moreover, weaknesses have been underlined within the trait EI model. First, it is still not clear whether these emotional-related constructs describe psychological traits or states (Hansenne & Bianchi, 2009). Depressive patients in remission showed higher scores on trait EI measures, compared to their own scores during the acute depressed phases. These findings may indicate that trait EI is a state measure and may not offer insights of psychological traits. However, results were not homogeneous across all scales. Thus, EI could consist of "both state and trait components which vary from sample to sample depending on the distribution of scores on temperament and character" (p. 67). Second, most of EI traits do not show sufficient independence from personality domains (Landy, 2006; Schulte, Ree, & Carretta, 2004). However, "emotionality" scale has consistently shown weak correlations with them. Thus, how people evaluate their own capabilities of recognizing, understanding, and sharing emotions with others could be suggested as the actual innovation within the trait EI model (Matthews et al., 2012). Third, the use of the term "intelligence" to indicate personality facets seems inappropriate and misleading (Matthews et al., 2012). The weakness of assessing a kind of "intelligence" with self-attribution questionnaires is well known (Mayer et al., 2016); self-reported intelligence shows small correlations with performance-based tests ($r \approx .30$) (Paulhus, Lysy, & Yik, 1998). Traditionally, intelligence has been tested through the evaluation of wrong or right answers. This helps to prevent results from social desirability or malingering. For this reason, I do think that Petrides and Furnham's (2003) alternative label (i.e., Trait Emotional Self-Efficacy) can help to clarify the difference between their construct - defined as a set of personality characteristics - and Mayer and colleagues' emotional intelligence.

3.3 Intellectual Giftedness and Emotional Intelligence

After describing the two main models of EI and their role in clinical psychology, I will review empirical studies in which emotional intelligence has been examined in intellectually gifted individuals. Unfortunately, little research has directly addressed this relationship and most of the studies have involved children and adolescents (Al-Hamdan, Al-Jasim, & Abdulla, 2017). This could affect the generalizability of results to the adulthood. Tables 3.2 and Table 3.3 list papers in

which relationship between intellectual giftedness and emotional intelligence have been examined, as intellectual ability or set of personality traits respectively.

Two different patterns can be observed in the tables. When EI is examined through performance-based tests (Table 3.2), intellectually gifted individuals obtain higher scores than average-intelligence peers, especially when tasks required more complex abilities (Zeidner et al., 2005). When differences between groups were not found, gifted still tended to show better performances in terms of processing speed (Liu et al., 2015a, 2015b). There is no empirical evidence supporting an opposite point of view. However, when EI is measured through self-attribution questionnaires (Table 3.3), outcomes appear controversial and less clear. In this circumstance, intellectually gifted children's results are not homogeneous. Some studies found that exceptional intellectual abilities are an advantage (Al-Hamdan et al., 2017; Karimi, & Besharat, 2010; Lupu, 2012; Sánchez et al., 2010), others found that they are quite independent from EI traits (Brasseur & Gregoire, 2010), and others that intellectually gifted individuals have better capabilities in some EI domains (e.g., adaptability and intrapersonal) but worse skills in others (e.g., stress management, impulse control and interpersonal) (Al-Onizat, 2012; Lee & Olszewski-Kubilius, 2006; Prieto et al., 2008; Schwean et al., 2006). About gender differences, females tend to report higher EI levels than males (Al-Hamdan et al., 2017).

Because of these inconsistent results, there has been a large debate in order to establish whether high intellectual abilities increase the likelihood to be more emotionally adjusted (Al-Hamdan et al., 2017; Guldemond, Bosker, Kuyper, & Van, 2007; Lovecky, 1986; Peterson, 2009). Emotions and cognitive abilities are developmentally interdependent, especially during infancy and childhood; in particular, verbal skills might play an important role in constraining the development of emotional intelligence. Indeed, Izard and colleagues (2001) found strong correlations between crystallized intelligence and emotion recognition (r = .53) and emotion labeling (r = .53). In turn, these abilities also correlated with psychological adjustment and their relationship remained statistically significant after removing the effect of verbal ability. Smith and Walden (2001) found similar results, describing receptive vocabulary as a protective factor between emotional deprivation in infancy and development of socio-emotional skills. Additionally, Zeidner and colleagues (2003) suggested that verbal competence may allow learning which emotions and feelings are more appropriate in specific social contexts and this would constitute an important component of emotional development (Denham, 1998; Matthews et al., 2017).

However, high crystallized intelligence has not always been confirmed as a protective factor. Lee and colleagues (2012) found that students with high verbal skills were more likely to face peer relational difficulties. Indeed, they usually have an advanced vocabulary and may express their ideas and feelings in idiosyncratic forms, making them incomprehensible to the others (Brody & Benbow, 1986; Dauber & Benbow, 1990). Moreover, high verbal abilities cannot compensate completely weaknesses in understanding others' intentions and point of views (i.e., Theory of Mind); gifted individuals who have this impairment may be at higher risk to develop interpersonal dysfunctions (French & Shore, 2009; Walker & Shore, 2011).

Besides different kinds of exceptional abilities, some people with high intellectual abilities could perceive themselves different from the others because of the asynchrony/discrepancy between their cognitive, affective and interpersonal skills. This may be influenced by the level of giftedness, differences in interests or abilities from social peers, support from the school or family, or the quality of cultural environments (Eddles-Hirsch, Vialle, Rogers, & McCormick, 2010; Neihart,

2006; Robinson, 2008). The social comparison may represent an important moderator between giftedness and psychological functioning (Zeidner et al., 2005). According to the Reference Model, Marsh and Hau (2003) suggested that social comparison affects individual self-perceptions; individuals tend to compare their characteristics and achievements with their own reference group; thus, this comparison might influence self-perceptions of skills and tendencies, and maybe even of EI traits. Social comparison influences social self-concept and the evaluation of anxiety in gifted population (Zeidner & Schleyer, 1999). People with high intellectual abilities may put strong effort to mask their extraordinary skills in order to avoid stereotypical perceptions; they can use idiosyncratic strategies, such as "playing dumb" or "self-berating" (Cross, Coleman, & Terhaar-Yonkers, 1991). However, on one hand, these behaviors may be perceived even worse by their peers, increasing psychological maladjustment to their own social environment. Thus, gifted individuals who may accept others' negative perceptions of them might score lower on self-report scales of EI. On the other hand, social relationships with other gifted may represent a protective factor, providing support that can prevent some of the negative effects related to the perception of giftedness. In this case, gifted people may obtain higher scores on self-attribution EI measures.

Finally, the small amount of literature on gifted individuals' EI does not allow to make a clear idea of this relationship. The two best-designed studies on this topic pointed to different conclusions. Zeidner and colleagues (2005) stated that results are "measure dependent"; indeed, gifted individuals showed higher scores on ability EI test, whereas lower on emotional-related traits when they are compared to their peers with average intelligence. Conversely, Schwean and colleagues (2006) suggested that results are "ability dependent"; based on a self-attribution questionnaire only, gifted students obtained score higher on intra-personal and lower on interpersonal ability, compared to a control group.

3.3.1 Research Questions

Based on the previous review, I will aim to test four hypotheses. Two of them will address to the external validity of EI measures (Hypothesis 1 and 2); whereas the latter two hypotheses will test differences in emotional intelligence between intellectual gifted and average-intelligence adults (Hypothesis 3 and 4):

Hypothesis 1. I will expect to find strong correlations between similar EI measures. Mayer and colleagues (1999) claimed that EI meets the correlational criterion (Spearman, 1904) supporting its status of intellectual abilities. For example, some tests aim to measure similar psychological constructs. For instance, MSCEIT Perceiving Emotions task assesses emotion recognition through visual stimuli. MERT (Banziger et al., 2009) is a performance-based test which measures the same ability through multiple sensory channels. Therefore, I will expect that individual performance in tasks involving visual stimuli should be strong and higher than correlations between tasks which involve different sensory modalities (such as photos vs. audio or body movements). Also, I will expect similar strong correlations between different self-report EI questionnaires ($r \approx .60$ to .70) (Austin, 2009).

Hypothesis 2. I will expect to find small but significant correlations between performance and self-estimates EI measures. Since typical correlations between these kinds of measures (Goff & Ackerman, 1992; Wilhelm, 2005), I will expect that MERT and MSCEIT will show low correlations with both TEIQue and SSRI ($r \approx .20$ to .30) (Karim & Weisz, 2010).

Table 3.2 Gifted individuals' performances on Emotional Intelligence tasks (EI as intellectual ability).

Citation	Gifted sample description	Definition of giftedness	EI Test	Results
Liu, Xiao, Li, & Shi, 2015a	15 males 13.6 ± 0.3 years	Enrollment in gifted program (based on intelligence test scores)	Emotion recognition task	Faster response speed when recognizing visual facial emotions; however, no differences in accuracy
Liu, Xiao, Li, & Shi, 2015b	17 males 13.7 (age range: 13.3-14.2 years)	Enrollment in gifted program (based on intelligence test scores)	Emotion recognition task	Faster emotion recognition and better pre-attentive processing of positive emotions
Yousefi, 2004	163 (73 males) 16.6 ± 0.6 years	Enrollment in high school for gifted (based on WISC-R score)	LEAS	No differences in emotional awareness between gifted and non-gifted students; however, non-gifted females performed better than gifted females
Zeidner, Shani-Zinovicha, Matthews, & Roberts, 2005	83 (57 males) 14.81 (age range: 12-15 years)	Students in Israeli gifted program (based on scholastic aptitude test and cognitive abilities test)	MSCEIT SSRI	Higher scores on MSCEIT Emotion Understanding and Management branches but lower SSRI scores; however, differences on MSCEIT fully explained by verbal abilities, suggesting the importance of vocabulary in emotional intelligence skills

Table 3.3 Gifted individuals' scores on Emotional Intelligence scales (EI as set of personality traits).

Citation	Gifted sample description	Definition of giftedness	EI Test	Results
Al-Hamdan, Al-Jasim, & Abdulla, 2017	80 (40 males) Age Range: 14-17 years	Multiple criteria (based on grades, cognitive tests, and teacher nominations)	EQ–i	Higher scores in Intrapersonal, Adaptability, General Mood scales, and in total EI score; within the gifted group, males had higher total EI scores than females
Al-Onizat, 2012	253 (132 males) Age Range: 12-16 years	Enrollment in special schools for gifted students	EQ–i	Higher scores in Adaptability but lower in Stress Management
Brasseur & Gregoire, 2010	90 (66 males) 14.2 ± 2.2 years	Underachievement students with WISC-R IQ > 125 or WISC-R VIQ or PIQ > 130	TEIQue	No differences in emotional intelligence scales; however, higher EI scores were significantly correlated with academic achievements within both groups
Chan, 2003	259 (123 males) 13.66 ± 1.34 years	Nominated to join gifted special education (based on teachers' recommendation)	EIS SCQ-17	Higher scores in Social Skills and Self-Management than Empathy and Utilization of Emotions
Karimi, & Besharat, 2010	86 (gender not available) 16.12 ± 0.62 years	Enrollment in special schools for gifted students	EIS-41	Lower scores on alexithymia total scale and fewer difficulties in recognizing own inner emotional states

Lee & Olszewski-Kubilius, 2006	234 (104 males) 16.2 (age range: 16-18 years)	Enrollment in summer programs for gifted	EQ–i: YV	Higher scores on Adaptability scale but lower on Impulse Control and Stress Management; within the gifted group, males were comparable to the normative sample, while females reported having poorer emotional skills
Lee, Olszewski-Kubilius, & Thomson, 2012	1526 (801 males) Age Range: 12-18 years	Enrollment in gifted summer programs (based on SAT or ACT score ≥ 90th percentile, teachers' recommendation, or enrolled in-school gifted program)	ICQ-R SS SCQ SPPA	More positive perceptions in initiating, forming, and maintaining relationships with other people. However, gifted students with high scores in verbal area were more likely to face peer relational difficulties
Lupu, 2012	57 (gender not available) Age Range: 14-17 years	Results at national and international math and Information Technology Olympic competitions	GEIS QMEE	Higher scores in emotional intelligence and emotional empathy
Prieto, Ferrándiz, Ferrando, Sáinz, Bermejo, & Hernández, 2008	202 (137 males) 8.28 ± 1.57 years	Multiple criteria (based on grades, cognitive tests, and teacher nominations)	EQ–i	Higher scores on Adaptability but lower on Intrapersonal scale
Schwean, Saklofske, Widdifield-Konkin, Parker, & Kloosterman, 2006	169 (84 males) 11.45 ± 1.10 years	Multiple criteria (based on grades, IQ score > 130, and teacher nominations)	EQ–i: YV EQ–i: YV-O	Higher scores on Intrapersonal and Adaptability scales but lower on Interpersonal scale. Considering only gifted sample, females had higher scores on Intrapersonal, Interpersonal, and total EI
Sánchez, Sierra, & Llera, 2010	94 (35 males) 12.25 ± 0.43 years	Not specified	TMMS EQ–i:YV	Inconsistency results between two instruments: higher scores on Stress Management and on Total EI-I YV; no differences in emotional perception, emotional comprehension, and emotional regulation measured with TMMS

Hypothesis 3. I will expect to find some differences between gifted and non-gifted individuals on EI abilities. According to the psychometric model of *g*, intellectually gifted individuals should score significantly higher than average-intelligence peers on performance-based measures. Indeed, gifted students showed higher results in emotional understanding and management subtests (Zeidner et al., 2005), and they performed faster in visual emotional recognition tasks (Liu et al., 2015a, 2015b). Additionally, in line with the investment model of emotional intelligence (Matthews et al., 2017), verbal skills would have causal and important effects on emotion-related competencies and areas of expertise. Therefore, I will expect that after controlling individual crystallized intelligence scores, differences between gifted and non-gifted on the MSCEIT will disappear.

Hypothesis 4. I will expect to find differences between gifted and non-gifted individuals on self-report EI measures. However, irregular evidence was reported based on EI self-report questionnaires; gifted have obtained significant differences on some tests (such as SSRI, EQ-i, TMMS, or SCQ; see Table 3.3 in § 3.3) but not on others (such as TEIQue, Brasseur & Gregoire, 2010).

3.4 Method

3.4.1 Participants

83 individuals (53 men) participated in this study. Socio-demographic characteristics of both samples are provided in Table 3.4. 35 out of them (26 men, corresponding to 74.29 % of the group) were recognized as intellectually gifted.

Table 3.4 Distribution of socio-demographic variables (i.e., gender, age and level of education) of both groups.

	Gifted Group	Comparison Group
N	35	48
Sex men, *n* (%)	26 (74.29)	27 (56.25)
Age Mean in years (± SD)	28.43 (± 5.56)	23.77 (± 3.11)
Age range	19 - 39	19 - 33
Level of Education in years, *n* (%)		
0-12 (Less than high school)	0	1 (2.08)
13-15 (High school or equivalent)	14 (40.00)	27 (56.25)
16-17 (Bachelor's Degree)	9 (25.71)	19 (39.58)
18+ (Master's Degree, Doctorate or more)	12 (34.29)	1 (2.08)
Indexes Scores Mean (± SD)		
IST-2000 Verbal Index	47.51 (± 4.34)	38.23 (± 7.33)
WAIS-IV Perceptual Reasoning Index	131.14 (± 12.17)	101.90 (± 13.08)
Index ≥ 98th percentile, *n* (%) [a]		
IST-2000 Verbal Index	17 (48.57)	0
WAIS-IV Perceptual Reasoning Index	26 (74.29)	0

[a] Indexes equal to or greater than 130 per single participants. The sum of Indexes exceeds the total number of gifted individuals because one can have more than one Index higher than 130.

Inclusion criteria were to have achieved the 98th percentile (i.e., 2 *SD* above the average) in at least one of two *cool intelligence* measures which were administered in this study (i.e., verbal or fluid intelligence). This sampling method was coherent with my first two studies and literature on giftedness (Gridley et al., 2003; Lang et al., 2017; Rimm et al., 2001; Wechsler, 2008a). The comparison group was composed of college students enrolled in a program at University of Milano-Bicocca and of young adults; also, they could not be Mensa members. For these reasons, the two groups were mutually exclusive. Gifted individuals' overall age range was from 19 to 39 (*M* = 28.43, *SD* = 5.56); the overall age range of the comparison group was from 19 to 33 and the average age was significantly lower (*M* = 23.77, *SD* = 3.11). Gifted participants reported a level of education equally distributed across high school, Bachelor's Degree, and Masters' Degree or Doctorate.

3.4.2 Measures

After filling a form about socio-demographic information, crystallized intelligence and fluid reasoning abilities were assessed using IST-2000 and the WAIS-IV. Then, they were administered specific tasks to measure emotional intelligence (i.e., MSCEIT and MERT) Finally, they completed self-report questionnaires (i.e., TEIQue and SSRI). Briefly, I will provide a description of these instruments. Each administration took approximately 180 minutes.

IST-2000 Verbal Intelligence (Amthauer, Brocke, Liepmann, & Beauducel, 1999, ed.it. 2001). This Index is derived from the sum of three IST-2000 subtests (i.e., Sentence Completion, Verbal Analogies, and Similarities) and it gives a measure of crystallized intelligence. Each task consists of 20 items and examinees are required to choose the correct answer among five options. In particular, Sentence Completion requires to complete a sentence with one missing word; Verbal Analogies requires to find out the relation between two words and complete another couple of words following the same rule. Similarities presents groups of words and participants have to find two of them with collective term in common.

WAIS-IV Perceptual Reasoning Index (Wechsler, 2008; ed.it. 2013). This factor is derived from the sum of three WAIS-IV subtests (i.e., Block Design, Matrix Reasoning, and Visual Puzzle). It is designed to assess fluid reasoning and visual processing skills tasks that measure abstract concept formation, visual-spatial reasoning, visual-motor coordination, ability to learn new information and to separate visual figures from the ground.

Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT, Mayer et al., 2003; ed.it. 2010). This test is a performance-based measure and it is composed of eight subtests and of a total of 141 items. Subtests and Composite scores are described in Table 3.5. There are four Composite scores (or *Branches*): (a) Perceiving Emotions (i.e., ability to identify emotions and feelings from others' facial expressions); (b) Using Emotions (i.e., ability to create emotional states which help to solve intellectual tasks and environmental challenges); (c) Understanding Emotions (i.e., ability to understand which emotions are more likely to be displayed in certain situations, how those can change over time and combine with others in different situations); (d) Managing Emotions (i.e., ability to adopt the most appropriate solution to regulate or manage strong and negative emotions). Based on these four abilities, Experiential and Strategic component of EI can be also computed. The first high-order area is composed of Perceiving and Using Emotions and reflects the ability to perceive, react, and use productively emotional information without putting much emphasis on the relationships with the environment. The second high-order area is composed of Understanding and Managing Emotions and it represents the ability to understand and regulate feelings and emotional

states in particular contexts without necessarily having direct experience of them. Finally, Emotional Intelligence Quotient (EIQ) is a general index which reflects the ability of thinking and perceiving emotions, having access, generating and using emotions to influence own thoughts, understanding and accumulating knowledge about how emotions can change over time and in different context; regulating emotions in order to promote emotional and intellectual development.

Table 3.5 Structure of the MSCEIT: Composite Scores and Subtests

Branch	Test	Task and stimuli	Responses
Perceiving Emotions	Faces	For each of 4 photographs, participants judge the extent to which the facial expression displayed five different emotions	Rating scales of 5 points, from 1 (*No emotion*) to 5 (*Extreme emotion*)
	Pictures	For each of 6 pictures which represent a landscape or an abstract design, participants are required to rate the degree of five different emotions that image induces	Rating scales of 5 emoticon cartoon faces indicating different levels of emotions
Using Emotions	Facilitation	5 scenarios; participants are asked to judge moods that assist cognitive tasks/behaviors (e.g., What mood might be helpful when composing an inspiring military march?)	Rating scales of 5 points, from 1 (*Not Useful*) to 5 (*Useful*)
	Sensations	5 scenarios; participants are asked to rate how situations or feelings can be described in terms of sensations (e.g., cold) or perceptions (e.g., warm, blue)	Rating scales of 5 points, from 1 (*Not Alike*) to 5 (*Very Much Alike*)
Understanding Emotions	Changes	20 items; participants are required to identify how emotions change when something new occurs	Multiple-choice task, requires picking one among 5 different options
	Blends	12 items; participants are required to identify how two or more emotions can mix together to shape new and more complex emotions	Multiple-choice task, requires picking one among 5 different options
Managing Emotions	Emotion Management	6 brief emotional situations; participants rate how behavioral strategies are likely to act positively on personal negative feelings	Rating scale from 1 (*Very Ineffective*) to 5 (*Very Effective*)
	Relationships	3 brief emotional situations; participants rate how behavioral strategies are likely to act positively on others' negative feelings	Rating scale from 1 (*Very Ineffective*) to 5 (*Very Effective*)

Multimodal Emotion Recognition Test (MERT, Banziger et al., 2009). It is a computer-based test and it is composed of 120 audio/video recordings where an actor interprets one of ten different emotions (i.e., cold anger, hot anger, panic fear, anxiety, despair, sadness, elation, happiness, contempt, disgust). Each emotional expression is presented in four different formats, i.e. photos, video only, audio only, audio/video. Participants are asked to select which emotion was represented. MERT gives four scores based on the sensory modality, two high-order scores based on the level of emotional intensity of the stimuli (i.e., low vs. high), and a total score that reflects the general ability of emotion recognition.

Trait Emotional Intelligence Questionnaire (TEIQue, Petrides, 2009, tr.it. 2016). It is a self-report inventory which assesses extensively Trait EI (Petrides & Furnham, 2001). The TEIQue is composed of 153 items which individuals are required to rate on a 7-point Likert scale. Individual results describe self-perceived emotional intelligence along 15 facets, 4 high-order factors, and a global measure of Trait EI. TEIQue has shown a good factorial structure and reliability in the

original edition in English and in other translated versions (Di Fabio, Saklofske, & Tremblay, 2016; Petrides, 2009) I provided a brief description of each scale and factor in Table 3.1 (§3.1.2).

Schuttle self-report inventory (SSRI, Schuttle, Malouff, Hall, Haggerty, ..., & Dornheim, 1998, tr.it. 2014). It is a self-report questionnaire in which individuals are required to rate 33 items relating to different aspects of emotional intelligence, on a 5-point Likert scale ranging from 1 (*Strongly Agree*) to 5 (*Strongly Disagree*). Examples of items are: "I know when to speak about my personal problems to others"; "Other people find it easy to confide in me". This scale was originally created to measure general EI and the four abilities of the Branch Model (Mayer et al., 2016). However, this factor structure was not replicated in other studies (Ciarrochi, Chan, & Bajgar, 2001; Saklofske, Austin, & Minski, 2003). For this reason, SSRI has been used as a general indicator of EI.

3.4.3 Ethical Statement

All participants were recruited on a voluntary basis and they gave a written informed consent before testing. The study was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and fulfilled the ethical standard procedure recommended by the Italian Association of Psychology (AIP).

3.4.4 Scoring System and Data Analysis

Results of MSCEIT were computed with consensus scoring methods and they were corrected for participants' age and gender. This scoring method has been extensively preferred over than the experts one (MacCann et al., 2004; Zeidner et al., 2005). Contrary to other intelligence tests (e.g., Wechsler scales), each MSCEIT subtest and the Composite score is standardized with a mean of 100 and a standard deviation of 15[19]. MERT has not been standardized for the Italian population. Thus, I calculated individual scores following the scoring system which is provided by the authors. TEIQue scores were calculated using the free online scoring engine at http://www.psychometriclab.com Finally, the scoring system for the SSRI was taken from the original paper the authors wrote in 1998. All the analyses were performed with SPSS 24.0 (IBM, 2016).

Based on the hypotheses, three steps of analysis were conducted:

1. **Pearson's correlations** to investigate the relationships between different EI performance-based tests.
2. **Pearson's correlations** to examine the relationships between different EI self-report questionnaires.
3. **Pearson's correlations** to explore the relationships between EI performance-based tests and self-report questionnaires.

[19] Scholars have no access to the scoring system because it is not published. Although I understand the reasons why the authors of this test have decided not to report the scoring system in the Manual, I do not like the policy they have adopted. Science should involve testable and verifiable processes (Popper, 1959). The MSCEIT does not allow to understand the relationships between single examinee's answers and their Composite scores. The interpretation of psychological test scores should not be separated from the administration process (even in the case of computer-based administration). That should be particularly true when the authors aspire to assess indicators of Emotional Intelligence.

4. **Multiple t-tests** to investigate the differences between gifted and non-gifted adults in EI domains. The magnitude of the effect sizes (i.e., Cohen's *d*) was also considered to examine the strength of the differences.
5. **Hierarchical multiple regression** to test the investment model applied to EI abilities suggested by Zeidner and colleagues (2005).

3.4.5 Results

Before presenting the results, I need to give the reader an important caveat. This study was essentially exploratory which means that "does not carry a specific hypothesis, but seeks to obtain useful data about a specific question" (Yang, 2005, p. 28). I intended to test empirical differences in emotional intelligence-related domains between gifted and non-gifted adults.

In the following steps, I will report descriptive and inferential statistics related to EI measures, and the outcomes will be interpreted as dependent on correlational analyses. First, contrary to expectations, performance-based tests did not converge. Although MSCEIT and MERT were created to assess in part the same psychological abilities (i.e., emotion recognition), their correlations were nonsignificant. Surprisingly, only the correlation between Perceiving Emotions and Using Emotions was statistically significant (r = .51) at the Index level. All other relationships among MSCEIT Broad Factors and among MSCEIT and MERT Total score were not significantly related (Table 3.6).

Table 3.6 Correlation Matrix between Broad Factors of EI performance-based tests (i.e., MSCEIT and MERT).

	Perceiving Emotions	Using Emotions	Understanding Emotions	Managing Emotions	EIQ	MERT
Perceiving Emotions	1					
Using Emotions	.51**	1				
Understanding Emotions	.10	.05	1			
Managing Emotions	.04	.20	.04	1		
EIQ	.84**	.74**	.38*	.34*	1	
MERT	-.03	-.12	.23^	.08	.00	1

N = 77. Legend: ** $p \leq .001$; * $p \leq .01$; ^ $p \leq .05$.

At subtests level, the correlation between MSCEIT Face and MERT Photos was nonsignificant (r = -.02). This result was unexpected because both tasks aim to measure the ability to recognize facial emotional expressions from static visual stimuli. There are few exceptions across other subtests (e.g., MSCEIT Changes and MERT Photos) but no theoretical reasons can reliably support them (Table 3.7). These coefficient values may reflect spurious correlations.

About EI self-report questionnaires, TEIQue and SSRI were strongly related (Table 3.8). Their Total scores showed strong correlations (r = .71); SSRI Total score had the highest association with Emotionality (r = .74). Within the TEIQue factors, Sociability had the largest associations with Well-Being (r = .58) and Emotionality (r = .48), whereas Self-Control displayed weak relations with Emotionality (r = .20) and Sociability (r = .32).

Table 3.7 Correlation Matrix between MSCEIT and MERT subtests.

	Audio	Audio-Video	Photos	Video
Face	.05	-.03	-.02	-.13
Picture	.02	-.08	-.04	.05
Facilitation	-.10	-.14	-.11	-.10
Sensation	-.07	.02	-.05	.03
Changes	.16	0	.31*	.02
Blends	.07	.16	.10	.17
Management	-.03	.04	-.15	-.07
Relationships	.31*	.17	-.07	.06

N = 77. Legend: ** $p \leq .001$; * $p \leq .01$; ^ $p \leq .05$.

Table 3.8 Correlation Matrix between Broad Domains of EI self-report questionnaires (i.e., TEIQue and SSRI).

	Well-Being	Self-Control	Emotionality	Sociability	TEIQue Total score	SSRI Total score
Well-Being	1					
Self-Control	.38**	1				
Emotionality	.36**	.20	1			
Sociability	.58**	.32*	.48**	1		
TEIQue Total score	.81**	.63**	.69**	.78**	1	
SSRI Total score	.54**	.25^	.74**	.53**	.71**	1

N = 81. Legend: ** $p \leq .001$; * $p \leq .01$; ^ $p \leq .05$.

Second, the correlation between ability test and self-report scores confirmed only partially my initial hypotheses. In particular, MSCEIT Understanding Emotions and Managing Emotions showed small correlations with the four TEIQue Factors and with TEIQue and SSRI Total scores (see Table 3.9). Although these correlations were not always statistically significant, most of them were included in the typical range of relationships between intelligence and personality tests. Differently, Perceiving Emotions and Using Emotions showed null associations with the TEIQue Factors. Moreover, MSCEIT EIQ correlated with TEIQue Emotionality (r = .20) and SREIT Total scores (r = .29). Surprisingly, MERT scores showed negative correlations with TEIQue Factors.

Table 3.9 Correlation Matrix between Broad Factors of self-report measures and performance-based tests.

	Perceiving Emotions	Using Emotions	Understanding Emotions	Managing Emotions	EIQ	MERT
Well-Being	.04	-.04	.09	.15	.06	-.25^
Self-Control	.16	0	.18	.18	.14	-.15
Emotionality	.19	.14	.27^	.18	.31^	-.14
Sociability	.03	.02	.20	.09	.08	-.15
TEIQue Total score	.14	.03	.23^	.20	.20	-.24^
SSRI Total score	.19	.16	.17	.22^	.29^	-.06

N = 77. Legend: ** $p \leq .001$; * $p \leq .01$; ^ $p \leq .05$.

Third, no relevant differences between gifted and non-gifted were found in emotion recognition tasks, neither on MSCEIT Perceiving Emotions nor on MERT subscales and Total score (Table 3.10). Also, the two groups did not show significant differences on the MSCEIT Using Emotions. The gifted group had a higher score on Strategic EIQ, $t(79)=0.44$, $p < .05$, Cohen's $d = 0.48$, which consists of Understanding and Managing Emotions. No difference was found between groups' EIQ.

Table 3.10 MSCEIT and MERT Group Differences on Subtest and Composite scores.

	Gifted Group (N = 35)		Control Group (N = 46)			
	M	*SD*	*M*	*SD*	*t*	Cohen's *d* [95% CI]
MSCEIT						
Perceiving Emotions	102.63	18.73	101.41	13.71	0.32	0.08 [-6.13, 4.04]
Face	110.74	19.75	109.76	15.26	0.24	0.06 [-6.49, 4.47]
Picture	99.09	15.54	98.59	13.57	0.15	0.04 [-5.11, 3.96]
Using Emotions	104.40	13.24	105.54	12.19	-0.40	-0.09 [-4.48, 3.43]
Facilitation	98.89	12.54	102.17	12.39	-1.18	-0.27 [-4.42, 3.31]
Sensation	107.83	12.91	107.57	11.27	0.10	0.02 [-4.26, 3.28]
Understanding Emotions	121.54	12.91	116.83	14.68	1.51	0.34 [-3.94, 4.58]
Changes	120.20	14.15	118.59	13.86	0.51	0.12 [-4.54, 4.15]
Blends	118.11	13.85	110.33	14.52	2.44	0.55* [-4.04, 4.75]
Managing Emotions	110.57	12.09	107.11	12.63	1.25	0.28 [-3.72, 3.93]
Management	107.71	12.95	103.46	11.83	1.54	0.35 [-3.94, 3.77]
Relationships	111.63	10.73	108.74	14.59	1.03	0.22 [-3.33, 4.44]
EIQ	110.06	14.73	108.74	12.18	0.01	0.10 [-4.78, 3.62]
Experiential EIQ	103.74	16.27	103.72	13.18	2.09	0.00 [-5.39, 3.81]
Strategic EIQ	120.69	11.95	115.02	12.16	0.44	0.48* [-3.48, 3.99]
MERT						
Audio	14.83	2.32	15.55	3.00	-1.58	-0.27 [-1.04, 0.60]
Audio-Video	20.31	2.44	19.82	4.10	0.09	0.14 [-0.67, 1.33]
Photo	16.31	2.52	15.84	3.56	0.34	0.15 [-0.68, 1.18]
Video	20.43	2.54	19.93	3.34	0.30	0.17 [-0.67, 1.13]
High intensity	37.11	4.81	36.95	7.10	-0.43	0.03 [-1.57, 2.08]
Low intensity	34.77	3.73	34.18	5.62	0.05	0.12 [-1.11, 1.75]
MERT Total score	71.89	5.79	71.14	11.24	-0.29	0.08 [-1.84, 3.33]

Legend: * $p < .05$. Effect size' interpretations: Cohen's $d \geq 0.20$ small effect (^); $d \geq 0.50$ medium effect (*); $d \geq 0.80$ large effect (**). Negative effect sizes mean that control group have higher scores in the scale.

In addition, verbal ability was correlated positively with MSCEIT Strategic EI ($r = .39$) and in particular with the Understanding Emotions branch ($r = .40$) (Table 3.11). These relationships were even stronger considering the comparison sample by itself, whereas in the gifted group the correlation coefficients were near zero. Differently, correlations between verbal ability and Perceiving and Using Emotions were nonsignificant and close to zero in both samples. These findings are consistent with previous studies in which correlations between crystallized intelligence and EI performance-based measures were examined (Roberts, Zeidner, & Matthews, 2001; Zeidner et al., 2005). The lack of correlations between intelligence tasks may be considered a violation of the "positive manifold" principle, i.e. all human cognitive abilities are positively correlated with one

another (e.g., Guttman & Levi, 1991; Jensen, 1998; Zeidner et al., 2005). WAIS-IV Fluid Reasoning showed weaker correlations with EI related abilities but in the same direction.

Table 3.11 Correlation between crystallized intelligence, fluid reasoning, and EI abilities.

	Total Sample		Gifted Group		Comparison Group	
	WAIS-IV IRP	Vocabulary Index	WAIS-IV IRP	Vocabulary Index	WAIS-IV IRP	Vocabulary Index
Perceiving Emotions	.07	-.06	.25	-.08	-.15	-.13
Using Emotions	-.06	-.09	.07	.03	-.14	-.15
Understanding Emotions	.25^	.40**	.02	.21	.32^	.49**
Managing Emotions	.10	.15	-.16	-.17	.11	.21
Experiential EIQ	.11	-.09	.20	-.05	-.16	-.17
Strategic EIQ	.29*	.39**	.03	.03	.29^	.50**
EIQ	.06	.05	.10	-.04	-.01	.07
MERT	.10	.12	.13	-.09	.22	.31^

N = 78. Legend: ** $p \leq .001$; * $p \leq .01$; ^ $p \leq .05$.

Hierarchical multiple regression was performed to establish if group differences on the MSCEIT Strategic EI were significantly dependent upon verbal ability scores. When verbal test score was placed into the model, this was statistically significant (i.e., $F(2,77)=4.38$, $p = .002$), and it accounted 13% of the Strategic EI variance. Indeed, verbal intelligence score was significantly related to the MSCEIT Strategic EI variance: $t(77)=3.12$, $p = .003$, standardized $B = .41$. This finding supports the investment model suggested by Zeidner and colleagues (2017); thus, group differences on EI are mostly outcomes of differences in verbal skills.

Fourth, about self-report questionnaires, all subscales were normally distributed (i.e., Skewness and Kurtosis values less than |1|). No statistically significant differences were found in the four trait EI Factors (Table 3.12). Gifted individuals reported higher scores only on Emotion Regulation subscale, $t(77)=2.42$, $p < .05$, with an effect size in the medium range (Cohen's $d = 0.56$). No difference was found between groups' SSRI Total scores.

3.5 Discussion

The main objectives of the study were: (a) to examine linear relationships between similar and dissimilar EI measures; (b) to study group differences in EI abilities and traits between gifted and non-gifted individuals; (c) to test the investment model of the development of EI.

First, EI ability measures (i.e., MSCEIT and MERT) showed an overall low degree of statistical association as I expected, either among the MSCEIT Factors nor between specific factors of the two ability tests. The four MSCEIT Branches showed small correlations with one another and mostly non-significant. Two reasons may have contributed to this result: a) small sample size ($N = 77$); b) methodological issues (e.g., content validity, scoring system, etc.).

Currently, the structure of the MSCEIT consists of four narrow abilities measured by very specific tasks (Wilhelm, 2005). However, it is still not clear whether these factors represent a sufficient and appropriate model of EI or the model may lack other important indicators (e.g., cognitive component of Empathy).

Table 3.12 TEIQue and SSRI Group Differences on Subscales and Broad Factors.

	Gifted Group		Control Group			
	M	*SD*	*M*	*SD*	*t*	Cohen's *d* [95% CI]
TEIQue						
Well-Being	5.28	0.92	5.08	0.84	1.00	0.23 [-0.07, 0.47]
Happiness	5.31	1.00	5.45	0.96	-0.60	-0.14 [-0,48, 0.13]
Optimism	5.19	1.19	4.75	1.17	1.59	0.37 [-0.02, 0.72]
Self Esteem	5.34	0.84	5.04	0.78	1.65	0.38 [0.10, 0.60]
Self-Control	4.78	0.95	4.41	0.69	1.88	0.46 [0.15, 0.66]
Emotion Regulation	4.70	0.96	4.22	0.81	2.42	0.56* [0.24, 0.79]
Impulse Control	4.95	0.97	4.71	0.89	1.13	0.26 [-0.06, 0.52]
Stress Management	4.68	1.34	4.31	0.98	1.41	0.33 [-0.12, 0.61]
Emotionality	4.83	0.97	5.01	0.62	-0.93	-0.23 [-0.55, -0.05]
Empathy	5.24	0.92	5.10	0.78	0.69	0.16 [-0.14, 0.39]
Emotion Perception	4.76	1.35	4.99	0.83	-0.88	-0.22 [-0.66, 0.03]
Emotion Expression	3.87	1.43	4.24	1.23	-1.21	-0.28 [-0.76, 0.07]
Relationships	5.44	0.78	5.69	0.70	-1.45	-0.34 [-0.60, -0.14]
Sociability	5.10	0.78	4.87	0.61	1.43	0.33 [0.08, 0.51]
Emotion Management	5.20	0.83	4.90	0.75	1.63	0.38 [0.11, 0.60]
Assertiveness	5.24	0.96	5.02	0.85	1.04	0.24 [-0.07, 0.49]
Social Awareness	4.85	0.93	4.68	0.74	0.90	0.21 [-0.10, 0.42]
Motivation	4.64	0.88	4.71	0.77	-0.38	-0.09 [-0.38, 0.14]
Adaptability	4.74	1.27	4.62	0.79	0.47	0.12 [-0.30, 0.35]
TEIQue Total score	4.94	0.70	4.83	0.45	0.81	0.20 [-0.04, 0.33]
SSRI Total score	125.71	15.09	123.67	12.05	0.65	0.15 [-4.85, 3.64]

Legend: * $p < .05$. Effect size' interpretations: Cohen's $d \geq 0.20$ small effect (^); $d \geq 0.50$ medium effect (*); $d \geq 0.80$ large effect (**). Negative effect sizes mean that control group have higher scores in the scale.

Convergent validity studies are important to define what psychological construct is assessed by the test and how close its measures are to other tests. Emotion recognition tasks can be considered the most representative indicators of Emotional Intelligence. This ability may be the precursor of more complex EI related abilities (Brackett & Mayer, 2003; Hall, Andrzejewski, & Yopchick, 2009). Surprisingly, the correlations between MSCEIT Face and MERT Photo and between MSCEIT Perceiving Emotions and MERT Total score were not significant. Thus, the validity of these tasks may be questioned (Wilhelm, 2005) because they may measure different psychological abilities rather than those claimed by the authors. This can limit generalization of individual test results to daily life experiences. Similar findings were found by Roberts and colleagues (2006) who administered a large battery of tests in order to measure both cool and hot abilities and examine the MSCEIT construct validity. They found null correlations between MSCEIT Faces and other two emotion recognition tasks, i.e. the Japanese Caucasian Brief Affect Recognition Test (JACBART; Matsumoto, LeRoux, Wilson-Cohn, Raroque, ... & Amo, 2000), and the Index of Vocal Emotion Recognition (Vocal-I; Scherer, Banse, & Wallbott, 2001). They listed several methodological differences that may contribute to explain the lack of convergence, such as sensory modality (i.e., photos vs. video, voice sound, body posture, etc.), instructions and response formats, scoring systems, or whether the tasks are time-limited or not. Thus, empirical evidence may suggest that two different scoring methods may be indicators of different latent variables; indeed, consensus

scoring may refer to a psychological domain of ability which does not overlap with accurate recognition of specific emotion expressions (Keele & Bell, 2009). Moreover, the authors of the MSCEIT have never clarified why they selected the four stimuli that currently compose the Faces subtest (Wilhelm, 2005). Future studies should examine these issues in order to improve test validity and clarify what abilities are captured by each task.

The significant correlation between MERT Total score and MSCEIT Understanding Emotions may support the hypothesis about the role of scoring system influencing the strength of relationships between variables. Indeed, Understanding is the only MSCEIT Branch whose scores are calculated by summing all correct responses (as well as in most intelligence tests). In line with the principle of the "positive manifold" (Spearman, 1904), this result also provides partial evidence for the intellective nature of knowledge about emotions.

By contrast, the Total scores of the TEIQue and the SSRI were strongly correlated, even though their theoretical models were supposed to be different. Also, the four factors of the TEIQue were correlated to one another, ranging from small to moderate coefficient values, and some of them showed even higher associations with SSRI Total score. The content validity of SSRI was confirmed because of the strong correlation between SSRI Total score and TEIQue Emotionality Factor; indeed, the authors of the SSRI claimed that this self-report inventory was created to assess Mayer, Salovey, and Caruso's model of ability EI. Emotionality has a particular status; in the literature of individual differences, it has shown consistently small correlations with the personality facets (Matthews et al., 2012), whereas other TEIQue Factors, such as Well-Being and Self-Control correlated strongly with them. Considering that emotionality can be an indicator of neuroticism and extraversion, the lack of strong relationships is surprising. However, this empirical evidence may help scholars and clinicians to define more accurately what exactly this factor measures. In fact, the TEIQue Emotionality Factor may be not an indicator of emotional intensity but it may provide a measure of perceiving and expressing emotions, and of how these capabilities are employed in social contexts to develop and sustain affective relationships. Matthews and colleagues proposed that it may be considered a measure of "social emotionality" (p. 66); whether people who report high scores on this factor are sincerely more capable to feel, recognize, and share emotions is an open question that affects every self-report questionnaire.

On the other side, TEIQue Self-Control Factor showed small correlation with SSRI Total, and it was weakly related to the other TEIQue factors. This finding is consistent with other studies (e.g. Vernon, Villani, Schermer, & Petrides, 2008) where Self-Control had strong associations with neuroticism (r = -.74). Hence, this capability appears poorly separated from personality facets. Indeed, two out of three skills that belong to this factor (i.e., emotion regulation and low impulsiveness) are typically assessed with personality inventories. In line with this evidence, few trait EI questionnaires measure self-control domain. Ability EI tests do not assess this psychological area either. For instance, there is not such factor in Mayer, Salovey, and Caruso's (2002) ability EI model.

Second, MSCEIT and MERT showed different kinds of correlations with self-report questionnaires, confirming only partially my initial hypotheses. Indeed, MSCEIT EIQ was correlated in the expected range with TEIQue Emotionality Factor, TEIQue Total score (nonsignificant – probably because of the small sample size), and SSRI Total score. Small correlations between self-report and ability EI measures could indicate different psychological constructs. The classic interpretation of this relation is based on the distinction between typical vs. maximum performance (Ackerman &

Heggestad, 1997). Several empirical studies have confirmed that EI constructs showed null or weak correlations (e.g. Goldenberg, Matheson, & Mantler, 2006; MacCann, Matthews, Zeidner, & Roberts, 2004; Van Rooy, Viswesvaran, & Pluta, 2005; Zeidner et al., 2005). For instance, Brackett and Mayer (2003) found that the MSCEIT was weakly correlated with the SSRI Total score (r = .18) (Schutte, Malouff, & Bhullar, 2009) and with the EQ-i (r = .21). Moreover, Brackett and colleagues (2006) pointed out that the correlations were similar for both men and women, showing that ability and self-report EI measures – based on the same four-branch structure and definition – correlated r = .19 and r = .27, respectively.

Surprisingly, MERT Total score showed a negative small but statistically significant correlation with the TEIQue Total score. Correlation coefficients were different between the two groups. People with average-intelligence showed a non-significant relationship (r = -.21), whereas gifted individuals showed a significant correlation (r = -.39). Although this result is unexpected, two non-mutually exclusive reasons can be suggested: a) the "emotional eavesdropping hypothesis" (Bechtoldt & Schneider, 2016; Elfenbein & Ambady, 2002); b) methodological artifact (e.g., ceiling effect, and small group size).

First, I previously reviewed the large amount of literature about the overall positive association between emotional decoding ability and positive life outcomes (§ 3.2.1); this relation has been confirmed in several different settings, such as psychological and psychiatrist clinic (Hofer, Benecke, Edlinger, Huber, … & Fleischhacker, 2009; Kee, Green, Mintz, & Brekke, 2003), hospital (Clark, Neargarder, & Cronin-Golomb, 2008), school (Trentacosta, Izard, Mostow, & Fine, 2006), and workplace (Bommer, Pesta, & Storrud-Barnes, 2011). Contrary to these findings, Elfenbein and Ambady (2002) hypothesized that positive psychological outcomes are associated only with moderate high scores in emotional recognition tasks. Ironically, individuals may have interpersonal difficulties not only when they cannot identify others' emotional expressions, but also when they can infer too many information of one's emotional state. Indeed, they found that people with superior emotional perception used to recognize negative emotional states that people attempted to conceal. This may make them distressed because they know that people around them have negative feelings and this may influence their interpersonal relationships and work environment. Thus, superior emotional perception may have unexpected negative backlashes. Simpson, Ickes, and Blackstone (1995) suggested a global interpretation to explain the reason why many studies found positive relations between emotion recognition and psychological adjustment, whereas others found a reversed association. They claimed that adaptive outcomes may have positive correlations with good or less intimidating emotional expressions, whereas negative correlations with potentially detrimental feelings or strong divergences in ideas or beliefs. Hence, using visual and vocal cues to infer others' psychological mood might represent an advantage or a disadvantage based on the content of particular emotions. The structure of the MERT may confirm indirectly this hypothesis because 8 emotions out of 10 have negative valence. Second, negative relationships between emotion recognition and self-reported trait EI may be a result of methodological artifact. Indeed, the MERT has been created specifically to "discriminate the whole range of the underlying competence continuum, with a *special emphasis on high skill levels* necessary to distinguish subtle differences between members of the same emotion family" (Banziger et al., 2009, p. 701). However, some items with low identification rate may create a ceiling effect (Kaplan, 1992). This appears clearer by looking at the differences in the *SD* values of the MERT subscales and Total score of gifted individuals compared to the other group (see Table 7). Those values were almost half of the control group. The lower the variability, the poorer the correlation. Moreover, the small sample size (N = 35) may decrease the likelihood that a statistically significant finding is an indicator of a true effect,

producing a false negative result (Button, Ioannidis, Mokrysz, Nosek, … & Munafò, 2013). Up to now, both explanations might sound reasonable to describe negative correlation between emotion recognition and trait EI. Both are meaningful and they are not necessarily mutually exclusive.

Third, the gifted group scored statistically higher on the Strategic EIQ than the control group ($p < .05$, Cohen's $d = 0.48$). Strategic EI measures higher-level knowledge and processing of emotions. Thus, people with high intellectual abilities perform better on tasks that evaluate how emotions interact with one another and change over time, emotional management fits into interpersonal relationships, and how they can manage their or others' intense emotional states. Indeed, small effect sizes were noted on MSCEIT Understanding and Managing Emotions branches (Cohen's $d = 0.34$ and 0.28, respectively). By contrast, Perceiving (both on the MSCEIT and on the MERT) and Using Emotions showed trivial effect sizes between the two groups. This finding is consistent with a similar study where EI abilities and traits were examined within a group of academically gifted students (Zeidner et al., 2005). Overall, data provide additional validity to EI abilities as components of the CHC Theory of the Intelligence (MacCann et al., 2013; Schneider & McGrew, 2018), confirming that intellectually gifted adults obtain higher results on performance-based EI tests, and that EI was related to crystallized intelligence.

Indeed, present data also underline the influence of verbal skills on emotional intelligence. Verbal abilities (*Gc*) were correlated with Strategic EIQ in the total sample. Several studies found strong associations between Strategic EIQ and other intellectual abilities (Harms & Credé, 2010; Joseph & Newman, 2010; Kong, 2014; Van Rooy & Viswesvaran, 2004; Zeidner et al., 2005). In line with the "Law of Diminishing Returns" (or SLODR, Spearman, 1904), Strategic EIQ and emotional recognition (measured by the MERT) were correlated with crystallized intelligence only in the comparison group. This well-known principle states that correlations among cognitive abilities are stronger at lower or average levels of IQ than they are in the gifted range (Jensen, 2003; Lang et al., 2017; Reynold & Keith, 2007).

These results are consistent with the Zeidner and colleagues' (2003, 2005, 2017) investment model of EI, which considers verbal ability as an indirect variable that can limit or support children's development of emotional and relational competences. For this reason, the study of EI abilities has increased in developmental and educational psychology. From early childhood, EI abilities might support personal and social skills, such as good interactions with parents and friends, and scholastic achievements (Denham, Bassett, Mincic, Kalb, … & Segal, 2012). Saarni (2007) identified six core emotion-related abilities: a) emotional awareness; b) understanding of others' emotional state; c) use of specific words to refer to emotions; d) empathy and compassion; e) management of strong and intense emotions; f) emotion regulation and coping strategies. These abilities may change from primitive to complex forms over the childhood and the adolescence. Interpersonal episodic events and procedural routines might promote the development of these abilities. Also, the maturation of the frontal areas of the brain has an important role; in fact, these regions are responsible for executive functions and control (Zeidner, Matthews, Roberts, & MacCann, 2003). Emotional skills affect many aspects of adults' everyday life (e.g., relationship with friends, partner, perceived work-related stress, etc.) (Mikolajczak, Menil, & Luminet, 2007). People with high levels of EI can face difficulties successfully, such as managing undesirable situations and interpersonal conflicts, or finding a compromise among different opinions and disagreement. They can verbalize their own emotional states and show empathy for others (Aghdasi, Kiamanesh, & Ebrahim, 2011; Carmeli, 2003). Zeidner's investment model of the development of EI is consistent with Saarni's (2007) perspective.

Different variables may be important at different stages of emotional development; for instance, temperamental effects in infancy, rule-based learnings in childhood, insights based on knowledge about complex emotions in adolescence and in adulthood. Intellectual abilities – especially crystallized intelligence – and metacognitive skills may support the development of emotional-related skills identified by Saarni (2007) and contribute to generating individual differences. Thus, intellectually gifted children and adolescents may have experienced their emotional development more quickly than their peers (e.g., superior thoughts to manage relational situations; Mayer et al., 2001).

However, two aspects are still unclear: a) description of developmental trajectories of EI abilities; b) valence of superior EI abilities in childhood. First, although EI has shown relevant relationships with *Gc*, no other cool abilities have been really considered; for instance, Kong's comprehensive meta-analysis (2014) found that EI correlates similarly with *Gf*, whereas Schneider and colleagues (2016) have speculated that emotional recognition may correlate differently with different perceptual abilities (*Gv* vs. *Ga*), based on which sensorial channel is involved in the task. Hence, developmental trajectories may be different for each EI component (e.g. Strategic-verbal vs. Experiential-nonverbal EI). Second, although many psychological outcomes showed positive correlations with EI, they may follow different patterns within the gifted population. On one hand, higher levels of EI abilities may increase the level of asynchrony within the emotional domain; indeed, EI challenges the construct of developmental asynchrony which is often considered an important feature of gifted children's development (Lang et al., 2017; Silverman, 2013). I remind the reader that this term refers to patterns of large discrepancies among cognitive, emotional, and psychomotor areas and this would be typical of people who possess superior intellectual abilities. Zeidner and colleagues (2005) showed that gifted students may have opposite patterns on different measures of EI (i.e. higher scores on EI ability test but lower scores on trait EI self-report). These results may indicate that they have great explicit knowledge about emotions but low confidence in their own capabilities. Thus, uneven psychological profiles may result in social-emotional maladjustments (Guénolé et al., 2013). Negative effects associated with superior EI abilities in gifted individuals may be explained by a) the above-mentioned "emotional eavesdropping hypothesis" (Bechtoldt & Schneider, 2016; Elfenbein & Ambady, 2002; Rozell & Scroggins, 2010); 2) ego defense mechanisms (such as intellectualization, rationalization, isolation, Greenspan, 1989; Westenberg, Blasi, & Cohn, 1998) that promote detachment between thoughts, affects, and emotions at different levels of severity. However, empirical evidence did not support the latter hypothesis; Pellitteri (2002, 2010) found that emotional knowledge was positively correlated with adaptive defense mechanisms and negatively correlated with maladaptive defense style. However, his studies involved relatively small samples that consisted of average-intelligence people. Future examinations should involve gifted samples to test whether this hypothesis may imply specific psychological vulnerabilities for people with high levels of emotional knowledge or should be rejected.

On the other hand, good social-emotional skills may help well-adapted gifted individuals to fulfill completely their potential (not only relative to their intellectual achievements). Indeed, higher levels of understanding and managing emotions are significantly associated with lower depressive mood (Demiralp, Thompson, Mata, Jaeggi, … & Gotlib, 2012), less neuroticism and higher self-esteem (Erbas, Ceulemans, Lee Pe, Koval, & Kuppens, 2014), more positive emotions and less negative experiences, better relationships and psychological well-being (Gross & John, 2003). Thus, "emotional giftedness" may represent a new domain in which people can reach extraordinary levels

(Mayer, Perkins, Caruso, & Salovey, 2000). If empirical evidence confirmed the validity of this construct, NAGC may consider expanding its definition of giftedness (NAGC, 2010).

Fourth, about self-report EI measures, gifted individuals reported differences neither on the four TEIQue Factors (i.e., Well-Being, Emotionality, and Sociability) nor on SSRI Total score. Thus, when measured through self-report questionnaires (i.e., TEIQue and SSRI), gifted adults showed similar levels of EI, compared to people with average intellectual abilities. Analogous findings were found in gifted children by Brasseur and Gregoire (2010). However, different results were found using different self-report questionnaires. For instance, Lee and Olszewski (2006) found that gifted students reported lower scores on stress management, and Zeidner and colleagues (2005) pointed out that they reported lower emotional self-efficacy. Two reasons may explain why gifted people obtained a high score in EI abilities, whereas they tend to show more dissimilar patterns in self-report tests among different studies. First, gifted individuals may have limited confidence in their own abilities and they could not use them productively in their life. Second, developmental asynchrony may moderate negatively the relationship between intellectual abilities and emotional-related behaviors since they were children; indeed, although they had higher abilities in understanding and managing emotions (measured by the MSCEIT), they may not show higher life satisfaction, or better interpersonal relationships (measured by the TEIQue). However, these hypotheses are not empirically supported, and they should be tested carefully in future studies.

3.6 Limitations and Future Directions

Finally, I will briefly describe some limitations of this study and I will suggest some future directions for new studies.

First, as I pointed out repeatedly in this chapter, the size of both groups needs to be increased. Moreover, the gifted sample consisted mostly of Mensa members. Although we administered intelligence tests to assess their *cool* abilities, I cannot consider them representative of intellectually gifted adults. Future studies should try to examine possible differences between gifted who are Mensa members and gifted who are not.

Second, the interpretation of EI scores is largely debated within the literature of EI. Test validity should be improved because it is not clear what they measure. For instance, two subtests of the MSCEIT (i.e., Picture and Sensations; see Table 3.5) assess abilities whose utility may be questioned. Also, the interpretation of EI results should be consistent with the abilities and/or tendencies measured by that particular test. Although the MSCEIT has shown a good validity (Mayer et al., 2002), the scoring system constitutes an important issue (Roberts et al., 2001). MSCEIT Composite scores have been interpreted alternatively as 1) “general declarative knowledge about emotions”, or 2) “cultural conformity” (Zeidner et al., 2005, p. 386). The first interpretation involves the knowledge learned in psychology courses in college (i.e., explicit vs. implicit); thus, MSCEIT results might indicate that gifted adults have superior abilities in general knowledge domain about emotions rather than having a real superior competence. In the same way, knowing how anxiety can be reduced does not guarantee that people will be able to relax when experiencing strong worries and irrational fears. Future studies may examine whether gifted individuals’ EI ability supports personal and relational attainments. By contrast, the second interpretation is related to the consensus scoring system. Yet, standardizing a test based upon the agreement of a large number of people may reflect how much someone’s beliefs match cultural norms. The adjustment to societal expectations may have positive consequences, but it should not

be interpreted as an intellectual ability. Future studies should examine this hypothesis extensively, by considering that the overlap between intellectual and emotional abilities cannot explain this relationship by itself.

Third, the validity of the TEIQue may be problematic because it is assessed with only one item of the test which requires examinee whether some of the responses were given 100% with honesty. Moreover, trait EI does not correspond to the individual level of emotional intelligence; it represents how people self-perceive their own levels of EI. Obviously, these two measures may diverge. This should be considered when interpreting results from questionnaires. Future studies should also examine the relationship between self-perceived EI and the same competence assessed by an observer (e.g., partner, friends, parents, etc.). This method is called “360 assessment” and this modified version of the TEIQue is available online (Petrides, 2009). 360 assessments may measure EI traits which are effectively employed in various contexts (Zeidner et al., 2005).

Conclusion

In his first editorial as the new Editor of the journal Clinical Psychological Science (CPS), Lilienfeld (2017) has pointed out that understanding of psychopathology requires multiple lenses of analysis (i.e., biological, psychological, and cultural) (Kendler, 2005; Schwartz, Lilienfeld, Meca, & Sauvigne, 2016). Each lens of analysis can provide an excellent description of some psychological disorders and less so for others. Lilienfeld has changed the original term "level" into "lens" because the former was misleading. Yet, the term "level" recalls hierarchical systems in which bottom layers represent boundaries for higher levels and their functioning, but not vice versa. Traditionally, the biological level has been assumed as causal primacy to psychological domains (Miller, 1996); for instance, Insel and Quirion (2005) suggested that understanding of mental disorders would improve if they were interpreted as neurological disorders. However, each level of analysis is not easily replaceable with another one (Lilienfeld, 2007). Complex studies on basic psychological science, such as epigenetics, have underlined the role of bidirectional interactions between genes and experiences during development (Gottlieb, 2007; Nigg, 2017). Thus, the term "lenses of analyses" emphasizes that each point of view offers a different sight of the reality but that none of them is the one that determines all the others.

I will integrate results from my three studies within the three lenses of analysis perspective suggested by Lilienfeld in order to give a broader view of the intellectual giftedness in adulthood.

1. The **genetic of high cognitive abilities** was examined in Galton's book (1869) which was about behavioral genetics. Although this topic has been overlooked for a long time, recently several studies have confirmed that there is a genetic influence in the expression of intellectual giftedness, which is defined by extremely high IQ scores (Haworth, Wright, Martin, Martin, ... & Hewitt, 2009; Plomin & Haworth, 2009; Plomin & Spinath, 2002, 2004; Shakeshaft, Trzaskowski, McMillan, Krapohl, ... & Plomin, 2015). Currently, a sample of 11,000 twin pairs with high *g* (i.e., top 15% rank) from four nations is the largest database on which scholars have tested their cutting-edge theories. I want to highlight two main findings: a) genetic and environmental influences on high intellectual abilities are not significantly different from parameter estimates for the general population. This is called "Continuity Hypothesis" (Fisher, 1918; Plomin, Haworth, & Davis, 2009) and it suggests that high intellectual ability is an outcome of similar genetic and environmental influences which contribute to individual differences through the normal distribution; b) gifted individuals' IQ is highly influenced by the environment in adolescence, whereas average-intelligence people's IQ is mainly influenced by heritability at the same age. This is called "extended sensitive period hypothesis" (Shaw, Kabani, Lerch, Eckstrand, ... & Giedd, 2008) and it suggests that cortical thickening of intellectually gifted individuals is more intense and tends to last longer. Also, they experience a more rapid thinning. These different trajectories might indicate protracted synaptogenesis and an extended period, during which one's brain is mainly receptive to environmental stimulations. Hence, from a genetic point of view, intellectual giftedness has shown similarities and differences with developmental processes compared to average-intelligence individuals.

2. **Psychological functioning of gifted adults** has been extensively examined in the present doctoral dissertation. The multimethod assessment was the methodological approach to integrate data from several sources of information and give a general description about

intellectual and personality characteristics of this population. The first finding is that gifted adults tend to show larger discrepancies across intellectual abilities. This may be a consequence of "developmental asynchrony" which has been proposed as a hallmark of giftedness (Alsop, 2003; Silverman, 1997). It indicates that cognitive, psychomotor, and emotional domains may develop at different times as well as at different extents. Many researchers have pointed out that developmental asynchrony may be both between different domains and within each psychological area (Guénolé et al., 2013; Vaivre-Douret, 2011). Although partial independent trajectories are common in human development, the magnitude of unevenness may be larger in people with extraordinary intelligence. For this reason, a single composite score (e.g. FSIQ) may be a weak measure of intellectual giftedness; by contrast, the analysis of the pattern of performance on intelligence test would improve accuracy and reliability of individual assessment. Moreover, reducing the role of verbal abilities may allow recognizing not only gifted people who have achieved important successes in school but also who do not necessarily work in high-level positions, have low educational level, or different cultural backgrounds. The second finding is that gifted adults tend to develop specific personality traits which may contribute to interpersonal maladjustments. Although they tend not to report difficulties in emotional regulation processes, they are too self-centered to really care about the others and to consider their needs and point of view. They can be interpersonal dominant, verbally hostile, or simply uninterested in conversing or spending time with people of inferior levels of intelligence. In the last scenario, they tend to prefer situations that require few social contacts and – if they are forced – they tend to get bored easily or be perceived as relationally awkward. On the positive side, social withdrawn has been also associated with intellectual abilities, need for cognition, and adult academic and occupation attainments (Schmidt, 2014). Based on developmental psychology, personality traits are the effects of the interactions among multiple processes over time. Thus, relational problems in adulthood tend to be associated with similar difficulties in school age; they often had older friends who could share similar interests and provide intellectual stimulation they needed. The third finding is that gifted adults tend to show divergent patterns of emotional-related abilities and traits. On one hand, they show superior knowledge about how emotions interact and change over time, and about effective strategies to manage negative feelings. On the other hand, when they self-evaluate those abilities, differences disappear and their skills are in the average range. These results may reflect an individual imbalance between explicit knowledge about emotions and beliefs about themselves. My hypothesis is that different patterns within an emotional domain may make gifted individuals more vulnerable to psychological maladjustments (Zeidner et al., 2005). Indeed, superior emotional knowledge without equivalent personality traits may promote detachment between thoughts and emotions, increasing the use of maladaptive defense mechanisms (e.g., intellectualization, rationalization, or isolation of affect).

3. **Cultural effects on gifted individuals** consist of two different aspects: a) inappropriate responses from the social environment; b) influences on the conception of giftedness. First, Preckel and colleagues (2015) have suggested that interpersonal context (e.g., family, peers, teachers, society) may not meet their needs and negative reactions may lead to social maladjustments, which in turn may represent long-term risks for psychological disorders (Karpinski et al., 2017) and personality vulnerabilities. Gifted individuals may be subjected to stereotypes and prejudices and experience discrimination (e.g., intellectual overqualification often prevents people with high IQ to receive job offers because they may

be bored and leave that position soon). As a minority, gifted people can have some hard times to create their own identity, increasing the level of psychosocial distress (Meyer, 2003). Second, identification criteria for intellectual giftedness may change across different countries based on what the conception of intelligence is embraced. There are large discrepancies about the idea of intelligence all over the world. Indeed, Western societies (such as American and European) tend to stress the role of genetic effects on the development of intelligence. This does not mean that environmental variables are overlooked. However, the principal aim of educators and teachers is to identify and support children's natural tendencies (Neihart & Tan, 2016). Differently, Eastern perspective (such as China and Japan) underlines the role of contextual influences. In such societies, children are supposed to have similar intellectual potential but different opportunities to turn into talents. High commitment and hard practice have an important role in this process. Thus, cultural differences affect what abilities and skills are tested to identify gifted people (e.g., FSIQ, broad intellectual abilities, emotional intelligence, scholastic achievements, talents in art and music, life successes, etc.). The lack of agreement has led to overlook some kinds of giftedness. Pfeiffer (2015) and Borland (2005, 2009) may be considered as the most extreme supporters of this approach. For them, intellectual giftedness is "a human invention" (Pfeiffer & Yarnell, 2016) and "a social construction" (Borland, 2009, p. 237).

In conclusion, psychologists and practitioners should always consider multiple lenses of analysis when assessing gifted individuals. My dissertation has aimed to show how this approach can lead to a broader understanding of the psychological functioning of this special group. Data from different sources should be integrated considering theories and models from inside and outside of the traditional edges of psychology. Multiple lenses of analysis can show different sights of intellectual giftedness, with some lenses that may be more useful to examine certain psychological domains, than others.

In 2005, Joseph Renzulli, one the main expert in the field of giftedness, wrote: "History tells us it has been the creative and productive people of the world, the producers rather than consumers of knowledge, the reconstructionists of thought in all areas of human endeavor, who have become recognized as "truly gifted" individuals. History does not remember persons who merely scored well on IQ tests, or those who learned their lessons well but did not apply their knowledge in innovative and action-oriented ways" (p. 256).

My hope is that scholars and clinicians could work together effectively in order to establish good practice for assessing, understanding, and helping gifted individuals who have felt "out-of-sync" in their whole life. Once turned into active personal strengths, their extraordinary intellectual abilities may improve their quality of life and – in some cases – also be remembered by the history.

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