

## Creativity and Autism Spectrum Conditions: A Hypothesis on Lewis Carroll

Stefano Calabrese, Maria Francesca Luziatelli  
University of Modena and Reggio Emilia

---

### Abstract

The hypothesis formulated by Simon Baron-Cohen and his collaborators on the onset of autistic syndromes and their link with an excess of the so-called S brain is reflected in the work of Lewis Carroll, a formal logic and mathematics professor deeply inclined to visual and spatial descriptions, interested in affordances and systemic circuits, and devoid of empathic tendencies in creating his characters. In the future, this finding may serve as a test for predicting autism spectrum disorders and support the elaboration of narrative artefact for therapeutic purposes in relation to people with autism.

---

### Keywords

Visuo-spatial abilities, autism, systemic circuit, arbitrary signs, empathy absence

---

### Contact

stefano.calabrese@unimore.it  
mf.luziatelli@libero.it

---

### 1. Does it work or does it not? The emotional desert

Everything in *Alice's Adventures in Wonderland* speaks of identity crises and malfunctions. Nothing is in where it belongs. Everything and everyone seems to rebel against the ontological status into which they were born. Suppose a little girl falls into a well and finds herself in a hallway lit by lamps, lined with locked doors and with a glass table with a golden key on it, which opens only one very small door hidden behind a curtain:

She found herself in a long, low hall, which was lit up by a row of lamps hanging from the roof. [...] Suddenly she came upon a little three-legged table, all made of solid glass; there was nothing on it except a tiny golden key, and Alice's first thought was that it might belong to one of the doors of the hall; but, alas! Either the locks were too large, or the key was too small, but at any rate it would not open any of them... (Carroll, *Alice in Wonderland*, 4-5)

These are the malfunctions: a door that is too small and a corridor too narrow to pass through, a key that does not fit the lock, and the main character who shrinks in order to pass through a door:

Round the neck of the bottle was a paper label, with the words "Drink Me" beautifully printed on it in large letters. [...] Alice ventured to taste it [...]. – What a curious feeling! – said Alice; – I must be shutting up like a telescope –. And so it was indeed: she was now only ten inches high, and her face brightened up at the thought that she was now the right size for going through the little door into that lovely garden. (5-6)

But now Alice is too small to reach the key on the table, the only key that opens that little door (6); she has to grow by eating a pastry but then she no longer fits through the door, and so on (7-8).

These are functional short circuits: psychologists use the word ‘affordances’ to describe the way our brain maps things based on their function, such as when we read the handle of a door as something to be grasped, pushed down and then released. Affordances establish a sense of reality; they link events, people and things, and they help us remember patterns of action, scripts, memories and projects. In Alice, everything collapses all at once, affordances do not work, and then, as if that was not enough, she suffers an identity crisis (Barnes 299-316). It is clear that these constant ups and downs, these shifts from micro to macro generate an ontological vertigo in Alice, and in the second chapter of the novel the protagonist feels bewildered, she wonders “Who am I?”, and if she has lost the memory: “– [...] the next question is, Who in the world am I? Ah, that’s the great puzzle! – 2 (9). Precisely to reassure herself about her identity Alice tries review multiplication tables, geographical features and rhymes, but without much success:

– Let me see: four times five is twelve, and four times six is thirteen, and four times seven is oh dear! I shall never get to twenty at that rate! However, the Multiplication Table doesn’t signify: let’s try Geography. London is the capital of Paris, and Paris is the capital of Rome, and Rome-no, *that’s* all wrong, [...]. (9)

At this point, Alice’s fears have turned into Mabel, a little girl who is evidently supposed to be uncultured and even poor – her opposite:

– I must be Mabel after all, and I shall have to go and live in that poky little house, and have next to no toys to play with, and oh! Ever so many lessons to learn! No, I’ve made up my mind about it; [...] I shall only look up and say “Who am I then?”. (9-10)

Meanwhile Alice keeps fanning herself and in so doing, without noticing, she gets smaller and smaller until she becomes invisible: “– I must be growing small again. - [...]: she soon found out that the cause of this was the fan she was holding, and she dropped it hastily, just in time to avoid shrinking away altogether” (10). She could move away from the door, but the key is on the table: “– and now for the garden! - and she ran with all speed back to the little door: but, alas! The little door was shut again, and the little golden key was lying on the glass table as before [...].” (11); in the meantime, Alice has slipped into the lake of tears poured when she was more than two meters and a half tall: “As she said these words her foot slipped, and in another moment, splash! She was up to her chin in salt water” (11).

Certainly, identity crises and malfunctions in affordances are not limited to the beginning of the text. In the fourth chapter, after entering the White Rabbit’s house and drinking the liquid from another small bottle with no label (22), Alice starts to grow again, she grows too big, she becomes enormous and has to stick one foot up the chimney and one arm out the window, finding herself completely stuck:

It did so indeed, and much sooner than she had expected: before she had drunk half the bottle, she found her head pressing against the ceiling, and had to stoop to save her neck from being broken. [...] She went on growing, and growing, and very soon had to kneel down on the floor: [...] and, as a last resource, she put one arm out of the window, and one

foot up the chimney, and said to herself – Now I can do no more, whatever happens. What *will* become of me? (22)

As often happens, Alice splits into two identities; she talks to herself and answers herself, scolding herself and giving herself advice. And so on. In chapter nine, a century and a half before hyper-modernity celebrated the triumphs of the fake, we find a counterfeit, what we might call an alias: the Mock Turtle, used to prepare Mock Turtle Soup (green turtle soup, usually made with veal). Alice does not know what a Mock Turtle is. However, this is how its story reads as told in the first person:

Once I was a real Turtle and went to school in the sea with a teacher, an old Turtle called Tortoise which gave the textbooks. At school we study French, music and extra-laundry, Rolling and Wrinkles, Ambition, Distraction, Uglification and Mockery, ancient and modern Mystery, Seas' Geography, Lug, Lengthening, Spiral Fainting. (86)

This very list will be of great use to Harry Potter and to students of Hogwarts.

## 2. The incomplete mission of language

Even words complicate dis-identity and ontological malfunctions. Extradited from ordinary language - where they drift away from the things of which they talk, as distant galaxies moving beyond the horizon of invisibility – Carroll's words conquer spaces where their meaning is increased and drag the reader backwards, toward the shadows of a reality that they do not cease to propitiate (Carroll and D'Amico). Even the theoretical Italian volume on imaginary literature *La grammatica della fantasia. Introduzione all'arte di inventare storie* (published for the first time in 1973), by writer G. Rodari, dug tunnels in the groove of language, endless and passionate tunnels to give veracity to language, on the assumption that language and thought establish a full identity, in the illusion that it is enough to tamper the former to subvert the latter (Rodari). But the initiator of this process is Carroll, who transformed language into the fourth kingdom of nature. After W. Nöth's and T. J. Reiss' studies we know that for the stutterer Reverend Dodgson the names roamed dangerously into reality, distorting its requirement (Leach): the fairy tale is for Carroll an excruciating adventure in a forest of names. Everyday language is linked to the idea of subjectivity and is responsible for the formation of the *ego*. Indeed, Carroll classifies individuals as names and objects. If words deteriorate, the *ego* is lost in the environment and invaded by the surrounding nature. When Alice dreams (as in *Alice's Adventures*), or when she is in the Queen of Heart's dream (in *Through the Looking Glass*), her psychic characteristics also change. *Alice's Adventures* begins with the image of a container without contents (an empty orange marmalade jar) and continues with a fable about the separation of phonemes from their communicative function.

The series is varied. The signs disappear. In the “forest without names” of *Through the Looking Glass* (chap. III) things have no name, beginning with Alice (Hellendoorn et al.). The protagonist risks nonexistence (“And now, who am I?”), at the same time Alice is away from the orders of parents. Signs that only take on meaning from the context, such as demonstrative pronouns or adverbs of time (yesterday and today), are ambiguous labels, refer either to the identical or different, but in the worst cases do not mean anything. During the report of a story, the Rat of Alice's Adventures (chap. III) says that “the Archbishop of Canterbury found it advisable”: the Rat therefore resorts to an ‘empty’ element

that forestalls what he will say, but the listener interprets it in relation to what has already been said, otherwise decodes it referring to the context. Speaking thus always implies missing the right word, moving from one word to another, explaining the first through the second and the second through a third: according to a contemporary of Carroll, C.S. Peirce, in this succession of words the speaker also risks to be transformed into the word itself.

Carroll's imaginary semiotics basically foresees the disappearance of the collective agreement that governs the birth of language, because the ambiguity of words and the frequent presence of nonsense is revealed in its arbitrary nature, invalidating the three priority tasks of each linguistic sign, listed by Carroll in his volume *Symbolic Logic* (1896) as defining, classifying and naming. Alice finds herself in a world of private or specialized languages, in which everyone assigns the meaning he/she wants to words, making signs obey individual will. The theory of the re-foundation of language stated by Humpty Dumpty in *Through the Looking Glass* (the words, especially verbs, "very proud" and disobedient to the user, should be used freely in exchange for an appropriate wage and must mean what each of us tells them to) leads the reader into a world without communication, because the signs are literally "portmanteau-words", suitcase-words.

Above all, words are not tools, but subjects. Therefore, playing cards move around in the world and alphabet letters are taken from a well (as in Chap. VII: "Drew a lot of things [...] all that was beginning to M..."). The language exposes its users to the risk of a systematic misunderstanding. The fantastic world acquires the features of a nightmare in which all communicate but no one understands, where words and things give the impression of an extreme struggle. Abbreviations acronyms (like dogs and cats reduced to C and G in the chapter III of Alice), words with the same sound (for example the «tail/tale» that complicates the dialogue between Alice and the Rat, still in the third chapter). The language challenges the user, the signs leave the man in the condition of a refugee silenced and unable to stem the haemorrhage of meaning. The biblical tale of Carroll's language is reduced to a dreamlike ghost, so his work has been in the twentieth century an interpretive model for the fairy tale as a liberating genre, able to undermine linguistic conventions. Elisabeth Sewell too saw the nonsense as an attempt to subvert the language, otherwise as the will to strengthen the language through, for example, the reduction of words to numbers (Sewell 185; Moseley et al. 413-22).

As a mathematician accustomed to numeric strings, which are much more reliable than words, Carroll loved the analogical language of photography, the only semiotic procedure able to access the sources of reality or even truth. In 1880, when he was forced to abandon photography because his obsession for little girls created a scandal at Oxford, he continued to paint them in Gertrude Thompson's studio. "Never trust language" Carroll seems to tell us: we are back to the point of the collapse of identity and the functional strike of reality, in a chaos of reversals where playing cards are alive, lobsters dance, rabbits are excellent editors of legal proceedings and so on (Hellendoorn et al. 40; Kana et al. 3000-03).

### 3. 1864: Underground literature

What is the origin of this phenomenon? Around 1865, life seemed to suddenly abandon reality with its orderly liturgies and its old standards, meanings and values. Everything was shaken up in a dizzying counter factuality; we are not here and now, we are in another

---

world, indeed the afterlife. Here we find an interesting coincidence. In 1885, Carroll wrote to 33-year-old Alice Liddell asking for the original manuscript of *Alice*, titled *Alice's Adventures Underground*, in order to produce a facsimile edition. There is no doubt that this is an underworld (Carroll, *Alice Underground*; *Alice's Adventures Underground*). Chasing the rabbit, Alice falls into a kind of pit furnished with shelves, cupboards and jars:

Either the well was very deep, or she fell very slowly, for she had plenty of time as she went down to look about her and to wonder what was going to happen next. First, she tried to look down and make out what she was coming to, but it was too dark to see anything; then she looked at the sides of the well, and she noticed that they were filled with cupboards and book-shelves; here and there she saw maps and pictures hung upon pegs. (*Alice in Wonderland* 2-3)

Indeed, the well is so deep that, while Alice falls, she reflects on its length: “Down, down down. Would the fall never come to an end! - I wonder how many miles I've fallen by this time? – she said aloud. – I must be getting somewhere near the center of the earth” (3); Alice can grab and replace a jar of jam:

She took down a jar from one of the shelves as she passed; it was labelled “orange marmalade”, but to her great disappointment it was empty: she did not like to drop the jar for fear of killing somebody, so managed to put it into one of the cupboards as she fell past it. (3)

Lastly Alice remembers her cat remained alone:

Down, down, down. There was nothing else to do, so Alice soon began talking again: - Dinah'll miss me very much to-night, I should think! - (Dinah was the cat.) - I hope they'll remember her saucer of milk at tea-time. Dinah my dear! I wish you were down here with me! There are no mice in the air, I'm afraid, but you might catch a bat, and that's very like a mouse, you know. But do cats eat bats, I wonder? - And here Alice began to get rather sleepy, and went on saying to herself, in a dreamy sort of way, - Do cats eat bats? Do cats eat bats? - and sometimes, - Do bats eat cats? - for, you see, as she couldn't answer either question, it didn't much matter which way she put it. She felt that she was dozing off, and had just begun to dream that she was walking hand in hand with Dinah, and saying to her very earnestly, - Now, Dinah, tell me the truth: did you ever eat a bat? (4)

Until Alice lands softly on twigs and dry leaves, but at this point there is another long tunnel and at the bottom Alice sees the White Rabbit run:

Suddenly, thump! Thump! Down she came upon a heap of sticks and dry leaves, and the fall was over. Alice was not a bit hurt, and she jumped up on to her feet in a moment: she looked up, but it was all dark overhead; before her was another long passage, and the White Rabbit was still in sight, hurrying down it. There was not a moment to be lost: away went Alice like the wind, and was just in time to hear it say, as it turned a corner, - Oh my ears and whiskers, how late it's getting! - She was close behind it when she turned the corner, but the Rabbit was no longer to be seen. (4)

Carroll wrote *Alice's Adventures* in 1864. That same year, *Notes from Underground*, also known as *Notes of the Underground* by Fyodor Dostoevsky was published, as was the famous

journey to the depths of the earth in Jules Verne's *Voyage au centre de la Terre*: different writers expressing the same creative and imaginative impulse.

In the humanities, especially in aesthetic and artistic activities, the radical transformation processes happen in relation to the social and historic context, economic trends, and technological innovations. Some experts of media studies have shown that in periods of economic recession or social transformation the level of inventive creativity suddenly increases, then it decreases in times of economic indexes and welfare growth. In moments of deep social transformation – like the one in which Carroll wrote, that is in the heyday of capitalism – the system invests in innovation, in particular in the field of communication and storytelling. An explanatory hypothesis is the one that follows: cultural and communicative innovation fills the gaps of the great social systems, *heals* the disorientation of society, when the destinies of individuals are problematic and unpredictable (Aubry), or conversely when the individuals' withdrawal in habitual lifestyles favours the emergence of innovative ideas, consumption modes and original associative skills. The cessation of the obvious – in the words of the philosopher Edmund Husserl – and the conquest of a fresh gaze which feels astonishment even before the standardized aspects of life are often the result of individual isolation or communities' disintegration; social transformations, states of isolation, ethnic or gender diversity: this produces innovation in the aesthetics sector, while the unchanged transmission of a work – e.g. folkloric texts – is the hallmark organic communities of the rural world, for which the traditions' permanence is an intrinsic value. Children literature offers several explanatory models: we just have to think about the claustrophobic atmosphere of Versailles at the beginning of the eighteenth century, on the first explosion of fairy-tale creativity, or just think about Carroll, in gloomy Victorian Oxford, while industrialization was creating immigration swarms that were radically transforming the country and the city. These status of sexual and psychological diversity, inductors of anomalies and solitude in stifling social contexts, generated the invention of unprecedented literary works, with boys and girls who lived in fantastic places, which, however, were central places at the heart of the real civil society; or with everyday objects acquiring human features, as in Andersen.

#### 4. A neurocognitive leap: the overwrought prefrontal cortex

*Alice* appeared when the European population performed a huge neuronal and cognitive leap: the improvement of lifestyles, the birth of modern and efficient pharmacology, unprecedented nutritional styles for humanity with vitamins and proteins that enhance mental performance and light new synapses. Imagination faithfully conveyed this collective exploits, in which counterfactuality plays a remarkable role, because the capacity to imagine, to formulate hypotheses, to devise predictive methods or simply fantasizing is the difference between us and other animal species. Paul L. Harris, leading scholar in the field of childhood imagination and professor of experimental psychology at Oxford University, argues that the simple formula “if + subjunctive” is the big bang of our neuronal and cognitive abilities: an increase of intellectual abilities grows the use of prefrontal cortex skills, the part of the brain part that matures later and in children – or adults suspected of regression as Carroll and James Barrie or Andersen – and that is particularly full of connections (Harris 28). According to recent studies in neurosciences, children are not defective adults from the cognitive point of view; nor are their neural networks inadequate. On

the contrary the immaturity of prefrontal cortex makes them super-adults, able to formulate hypotheses and predictions to 360 degrees: for this, children appear, indeed, imaginative (Gopnik). For adults, in fact, the use of the prefrontal cortex when they want to implement a complex plan involves the inhibition of all actions not geared to that purpose: in this sense, being adult means limiting (inhibit) predictive counterfactual imagination that, on the contrary, is very productive in childhood (Barnes 310); the so-called fantasy is therefore the uninhibited exercise of the prefrontal cortex and the systematic application of counterfactual thinking to objects, events and action patterns of daily life. For this reason, since Carroll – and thanks to Carroll – counterfactuality effectively entered the lives of children, of European teenagers of the late nineteenth century and permeated, as never before, literary narrations. During his course of fantastic literature in Reggio Emilia, Rodari would say that the most absurd and counterfactual projections represent scripts for social action (Rodari).

Counterfactual orientation is a complex skill that allows people to create and manage imaginative dimensions, fictional statuses and beliefs, and consequently allows to distinguish reality from imagination. Recent research has shown that children with high index of fantasy orientation are more involved and engaged in the dimension of imagination and simulation, but these children simultaneously demonstrate a higher index of boundaries awareness between reality and fantasy.

Alice is the realm of magic, of transgression against physical constraints: objects are alive; physical, temporal and spatial laws are violated, while metamorphosis and supernatural beings are the protagonists of the fairy-tale plot. In general, *Alice* features four kinds of transgression of the causality principle: 1. direct effect of consciousness over matter, the power of thoughts creates and moves physical objects (mental perception about reality and knowledge: connection between magic and matter); 2. sudden acquisition of vitality by an inanimate object (anthropomorphism: link between magic and animation); 3. violation of the fundamental laws of object permanence (counterfactuality: report about space, time and corporeality); 4. transformation of objects and events in fluid modality through similarity or contact (metamorphism). Transgression of the principle of causality is at the core of fairy tale narration, creating moments with strong emotional impact. In particular, the metamorphosis of characters appears radical and engaging, it contradicts the relationship of cause and effect through the introduction of a magical element: in *Alice* the metamorphosis causes a reversal of the reader's expectations and triggers unexpected cause-effect's relationships.

## 5. The «S» Brain: visuospatiality, asemanticity and anaffectivity

The case of Lewis Carroll may demonstrate the correctness of Simon Baron-Cohen's theory on the existence of "empathetic" (E) and "systematic" (S) brain types (Baron-Cohen, *The Essential Difference: Men, Women and the Extreme Male Brain*). In particular, according to the professor of Developmental Psychopathology, (i) the S brain is characterized by orderliness, resolution of functional problems, unfamiliarity with empathy and emotions, and *predominance of visual and spatial dimension* over all others (Grandin); and (ii) an excess of testosterone (observed in people with autism syndrome) radicalizes these trends causing sexuality to follow an inverted U-shaped curve whereby the hyper-masculine becomes hyper-feminine (Baron-Cohen et al.; Baron-Cohen, *The Science of Evil: On Empathy and the Origins of Cruelty*; "Autism, maths, and sex" 790).

First of all, we must remember that Reverend Dodgson taught mathematics and formal logic at the University of Oxford (Carroll *Mathematical Recreations*), and we know that many mathematicians suffer from Asperger syndrome or Autism. Furthermore, his brain had clear systemic abilities and problem-solving propensities. Indeed, everything in his two Alice novels (*Alice's Adventures in Wonderland*, 1865; *Through the Looking Glass and What Alice Found There*, 1871) is about identity crisis and malfunctions. We see Carroll's absolute bystander status during the years in which he wrote *Through the Looking Glass* and *Hunting of the Snark* – a dark allegory about a ragtag army hunting a strange half-shark and half-snail creature – and his antivivisectionist passion perhaps almost as if to compensate for his substantial inability to establish emotional relationships or express emotions (Leach 325; Sucksmith et al.); his child or pre-teen partners are consistently interchangeable, especially in later years (artist Theo Heaphy, actress Isa Bowman and mathematician Ethel Rowell). He had a passion for puzzles and habit, theorized as a therapy against neuronal degeneration, of formulating syzygies before falling asleep. Hyperkinesia forced him to move constantly from Oxford to London, to his beach house and to the homes of numerous acquaintances scattered across southern England. He believed that it is not pain (an emotion) rather sin (a concept) that “makes each individual eat dust” like nothing else in life (Leach 343). He had an inveterate passion for singing, mathematics and geometry (Carroll, *Euclid and His Modern Rivals*). He was immobile behaviourally and facially, devoid of emotional modelling tools according to the ‘stoic’ model which many acquaintances ascribed to him (Leach 36; Bos et al. 194). He was obsessed with photography, practicing daily from 1856 to 1881, when images of naked girls got him into trouble. All of these traits convey difficulty in recording perceptual data as emotional data (Baron-Cohen, “Autism: The Empathizing-Systemizing (ES) Theory; Tavassoli et al.; Kumar; Cassidy 193), creating an emotional void filled only by an overflowing visual and spatial ability (Grandin; Panek), to the point where he even perceived death as an iconic obfuscation (as stated in his 1860 poem, *Faces in the Fire*) (Woollcott and Tenniel 875).

## 6. Buttery identities: autism spectrum disorders

Although from the age of ten until his death Carroll noted down in a diary everything he thought worth being put into writing, revealing the typical tendency of people with autistic syndrome to focus on details (Barnes; Baron-Cohen), there is nothing that can really be defined as a passion, even for Alice Liddell (Lai). The author of the visionary Alice truly seems to have been invented by Baron-Cohen: nearly deaf in his right ear – controlled by the left hemisphere, in a minority in Carroll's case – and a stutterer like his seven brothers, so as to force him to practice a series of vocal exercises to improve the management of Broca's area (left hemisphere), prisoner of a left-handedness that the Freudians of the Thirties interpreted as proof that Carroll's compulsive identity was “pathological” (Leach 90) and wearing gloves everywhere to avoid direct contact with the environment.

Carroll is systematic; he loves transforming reality into a snapshot and removing the boundaries separating the living from the non-living, the organic from the inorganic. Particularly significant is the memory of Isa, one of Carroll's young friends, of a truly incredible bat-shaped toy with which she and Carroll used to play, constructed ingeniously using gauze and thread, and that fluttered around the room like a real bat (Leach 51; Mammarella et al. 1349). In the future, these tunnels dug in Carroll's S brain may become predictive



tools to guide the cognitive, emotional and creative development of very large samples of the population, but only in a future where both the book and its reading change radically.

If we now return to our writer and reconsider more generally his icy, irritant loneliness (Woolf), we see that he was the pioneer of a movement of thought for which imagination should not come to power, for the simple reason that it never lost that very same power. It is amazing to see how Carroll is alive among contemporary readers (Brooker): not among expert readers, but among readers/performers, who between ten and eighteen years become authors of the texts they read; we mean fanfiction authors, such as the forty million who have loaded eighty million of fan fiction on *Wattpad*, one of the largest communities of readers and writers in the world, which through a website and an app have the opportunity to communicate via email or through a chat room their own versions of famous texts and their comments. Practically, authors publish their works online for free, while readers not only read them, but can comment, make suggestions to the writers directly by *Wattpad* or share them on social networks and, above all, they have the opportunity to join the community as authors. The innovative aspect of this platform is to propose a true model of shared writing that, through the writer-reader interaction, is able to change the form and content of narrations. Therefore *Wattpad* is an early example of creation and publication of future books. Suffice it to say that Anna Todd and her toxic *After* come from there. When a reader acquires the same rights as the author, a fan fiction is born, and narrative production by readers becomes rather more important than the author's text, especially in the case of 'closed' texts, where such practices 'reopen' continually the story ensuring the permanent existence of the fan community, with their shared values and a strong emotional investment. To browse the websites dedicated to the readers' production - as [www.fanfiction.net](http://www.fanfiction.net) - means immersing oneself into thousands of fictions, many of which are inspired by Alice, written and shared by fans in more than thirty languages, making first-hand experience of those morphologies that are restructuring the cyber-cosmos. New immersive grammars emerge. Fans turn over the original text, they interpret the primary author's imagination and invent the novel of the novel. What if Alice eats the blue caterpillar in one bite? And what if the White Rabbit falls in love with the Mock Turtle? And what if...?

So, Alice is pervasive among fan fiction authors, rewritings are constantly being published - sequels, spin-offs, new codings, some of which have even become famous (Brooker): e.g. *50 shades of Alice* by Melinda DuChamp, almost a bestseller, in which the eighteen-year-old Alice has a passionate boyfriend named Lewis. But much more interesting, to understand how Carroll still acts as a fertilizer, is to read *Alice in Wonderland, the true story* by Ellygance27, where the Prince of Swords loves Alice but she hates him, and stammers of anger when sees him. *Alice has never believed in fairy tales, but what happens when she is part of it?* written by Xpaigegirl29 is fascinating: here Alice leads a very normal existence, but since childhood she has been having bad dreams, where a fantasy-world unfolds, slowly, through flashbacks and previews worthy of a professional writer. Finally, we have authorial rewritings, especially as graphic novels: e.g. *The Looking Glass Wars* (2006-2009), the trilogy by Frank Beddor about a negative foreshadowing of the future, or *Alice in Zombieland* by Nickolas Cook (2011), belonging to horror genre, or even *Alice in Murderland* (2015), a manga about a dark future. Will Alice ever die?

## Bibliography

- Aubry, Timothy. *Reading as Therapy. What Contemporary Fiction Does for Middle-Class Americans*. Iowa: Iowa UP, 2011. Print.
- Barnes, Jennifer. "Fiction, imagination, and social cognition: Insights from autism." *Poetics* 40.4 (2012): 299-316. Web.
- Barnes, Jennifer and Simon Baron-Cohen. "The big picture: storytelling ability in adults with autism spectrum conditions." *Journal of autism and developmental disorders* 42.8 (2012): 1557-65. Web.
- Baron-Cohen, Simon. "Autism, maths, and sex: the special triangle." *The Lancet Psychiatry* 2.9 (2015): 790-91. Web.
- . "Autism: The Empathizing-Systemizing (ES) Theory." *The Year in Cognitive Neuroscience – 2009. Annals of the New York Academy of Science*. Hoboken: John Wiley and Sons, 2009. 68-80. Web.
- . *The Essential Difference: Men, Women and the Extreme Male Brain*. London: Penguin, 2012. Print.
- . *The Science of Evil: On Empathy and the Origins of Cruelty*. New York: Basic, 2012. Print.
- Baron-Cohen, Simon, Michael Lombardo, Bonnie Auyeung, Emma Ashwin, Bhismadev Chakrabarti and Rebecca Knickmeyer. "Why Are Autism Spectrum Conditions More Prevalent in Males?" *PLoS Biology* 9.6 (2011). Web.
- Bos, Peter, Dennis Hofman, Erno Hermans, Estrella Montoya and Simon Baron-Cohen. "Testosterone reduces functional connectivity during the 'Reading the Mind in the Eyes' Test." *Psychoneuroendocrinology* 68 (2016): 194-201. Web.
- Brooker, Will. *Alice's Adventures: Lewis Carroll in Popular Culture*. London: A&C Black, 2004. Print.
- Carroll, Lewis. *Alice's Adventures Underground*. New York: Sterling. 2015, Print.
- . *Alice in Wonderland*. Wickford: North, 1998. Print.
- . *Alice Underground*. Roma: Stampa Alternativa, 2002. Print.
- . *Euclid and His Modern Rivals*. North Chelmsford: Courier, 2004. Print.
- . *Mathematical Recreations of Lewis Carroll: Pillow Problems and a Tangled Tale*. North Chelmsford: Courier, 1958. Print.
- Carroll, Lewis and Masolino D'Amico. *Il mondo di Alice*. Milano: Rizzoli, 2006. Print.
- Cassidy S.A., B. Stenger, L. Van Dongen, K. Yanagisawa, R. Anderson, V. Wan, S. Baron-Cohen and R. Cipolla. "Expressive visual text-to-speech as an assistive technology for individuals with autism spectrum conditions." *Computer Vision and Image Understanding* 148 (2016): 193-200. Web.
- Gluga, Teodora, Rachael Bedford, Tony Charman and Mark Johnson. "Enhanced Visual Search in Infancy Predicts Emerging Autism Symptoms." *Current Biology* 25.13 (2015): 1727-30. Web.
- Gopnik, Alison. *The Philosophical Baby: What Children's Minds Tell Us About Truth, Love, and the Meaning of Life*. Basingstoke: Picador, 2010. Print.

- Grandin, Temple and Richard Panek. *The Autistic Brain: Helping Different Kinds of Minds Succeed*. New York: Mariner, 2014. Print.
- Grandin, Temple and Oliver Sacks. *Thinking in Pictures: My Life with Autism*. London: Vintage, 2006. Print.
- Harris, Paul. *The Work of the Imagination*. Hoboken: Wiley-Blackwell, 2000. Print.
- Hellendoorn, Annika, Lex Wijnrocks, Emma Van Daalen, Claudine Dietz, Jan Buitelaar and Paul Leseman. "Motor functioning, exploration, visuospatial cognition and language development in preschool children with autism." *Research in Developmental Disabilities* 39 (2015): 32-42. Web.
- Kana, Rajesh, Yanni Liu, Diane Williams, Timothy Keller, Sarah Schipul, Nancy Minshew and Marcel Just. "The local, global, and neural aspects of visuospatial processing in autism spectrum disorders." *Neuropsychologia* 51.14 (2013): 2995-3003. Web.
- Kumar, Sandhya. "Examining the Characteristics of Visuospatial Information Processing in Individuals with High-Functioning Autism." *Yale Journal of Biology & Medicine* 86.2 (2013): 147-56. Web.
- Lai, Meng-Chuan, Amber Ruigrok, Andrew Baron, Michael Lombardo, Bhisadev Chakrabarti, Stephanie Ameis, Peter Szatmari and Simon Baron-Cohen. "Adulthood gender variance in males and females with autism spectrum disorder." *Journal of the American Academy of Child & Adolescent Psychiatry* 55.10 (2016): 102-03. Web.
- Leach, Karoline. *In the Shadow of the Dreamchild: The Myth and Reality of Lewis Carroll*. London: Peter Owen, 2015. Print.
- Mammarella, Irene, David Giofrè, Sara Caviola, Cesare Cornoldi and Colin Hamilton. "Visuospatial working memory in children with autism: The effect of a semantic global organization." *Research in Developmental Disabilities* 35.6 (2014): 1349-56. Web.
- Mendelson, Edward and Eric Copeland. *Lewis Carroll. Poetry for young people*. New York: Sterling, 2000. Print.
- Moseley, Rachel, Yury Shtyrov, Bettina Mohr, Michael Lombardo, Simon Baron-Cohen and Friedemann Pulvermuller. "Lost for emotion words: What motor and limbic brain activity reveals about autism and semantic theory." *NeuroImage* 104 (2015): 413-22. Web.
- Rodari, Gianni. *La grammatica della fantasia. Introduzione all'arte di inventare storie*. Torino: Einaudi, 2013. Print.
- Scrittori, Anna Rosa. *Alice e dintorni: figure della creatività di Lewis Carroll*. Venezia: Supernova, 2003. Print.
- Sewell, Elizabeth. *The Field of Nonsense*. London: Chatto&Windus, 1952. Print.
- Shansky, Rebecca. *Sex Differences in the Central Nervous System*. London: Academic Press, 2015. Print.
- Sucksmith, E., C. Allison, S. Baron-Cohen, B. Chakrabarti and R.A. Hoekstra. "Empathy and emotion recognition in people with autism, first-degree relatives, and controls." *Neuropsychologia* 51.1(2013): 98-105. Web.

- Tavassoli, Teresa, Keziah Latham, Michael Bach, Steven Dakin and Simon Baron-Cohen. "Psychophysical measures of visual acuity in autism spectrum conditions." *Vision Research* 51.15 (2011): 1778-80. Print.
- Wilson, Robin. *Lewis Carroll in Numberland: His Fantastical Mathematical Logical Life; An Agony in Eight fits*. London: Allen Lane, 2008. Print.
- Woolf, Jenny. *The Mystery of Lewis Carroll: Discovering the Whimsical, Thoughtful, and Sometimes Lonely Man Who Created "Alice in Wonderland."* London: Macmillan, 2010. Print.
- Woolcott, Alexander and John Tenniel. *The Complete Works of Lewis Carroll*. London: Nonesuch P, 1939. Print.