

## Personality and Creativity

### What is personality?

While people use the term "personality" to mean many different things, it has been very precisely defined over decades of modern psychometric research. There are different theoretical approaches to defining personality, but the predominant "trait theory" suggests that personality is the characteristic pattern of thoughts, feelings and behaviors habitually enacted by an individual. The main traits of personality are a continuum of behavior along five dimensions, called the "Big Five Factors":

1. Openness to new experiences,
2. Conscientiousness,
3. Extraversion,
4. Agreeableness and
5. Neuroticism.

While temperament is biologically-based and is present before birth, rudimentary elements of personality begin to appear around the age of two and are very malleable and subject to dramatic shifts until they stabilize in early adulthood. Researchers generally agree that though personality does undergo gradual and mild developmental fluctuations after this point, it remains fairly consistent throughout the remainder of one's life. It is of interest to caregivers, clinicians and researchers involved in the lives of patients with dementia because some types of neural degeneration and injury can lead to profound changes in personality.

### The anatomy of personality

Neuroimaging studies in healthy individuals and those with brain diseases have revealed a relationship between personality traits and specific brain regions. Generally, the right hemisphere of the brain plays a more central role than the left in social and emotional behavior, thus many regions

related to personality are primarily right-sided. Some of the main research findings involve traits related to the Big Five factors *Extraversion* and *Agreeableness* :

- **Extraversion** — Extraverted people tend to seek out social interactions and engage in them in an active, often highly verbal manner. Accordingly, extraversion mostly relates to dorsolateral frontal lobe regions associated with action planning, task management and goal setting. In addition, extraversion correlates with brain regions involved in emotion processing such as the insula and the anterior cingulate, reflecting the emotional aspects of social engagement.
- **Warmth** — Warm-hearted people also seek social interactions, but desire to provide care and support to others, even to the extent of often putting others' needs above their own. In line with this behavioral pattern, the personality trait warmth relates extensively to brain regions involved in emotion processing, including the amygdala, temporal pole, insula, anterior cingulate, and the most anterior parts of the frontal lobes.
- **Dominance/Assertiveness** — Dominance reflects the tendency to negotiate with one's environment to accomplish personal goals, regardless of whether those goals conflict with those of others. Thus, similarly to extraversion, dominance relates to brain regions involved in action planning and task management; however, in contrast to extraversion, dominance does not appear to involve brain regions that mediate emotion processing.

Though there is now considerable evidence for a structural basis for personality in the brain, other non-structural organic and environmental factors influence personality as well. For instance, depressed individuals likely have altered neurotransmitter and hormone levels in the brain, and might become less extraverted, warm-hearted and assertive even without structural brain changes. Individuals with language problems severe enough to impair their communication with other people might become less extraverted and assertive because they can no longer accomplish their interpersonal goals verbally.

## What is creativity?

Creativity is one aspect of personality that is characterized by novel and appropriate (or relevant) ideas, processes or objects. Creativity has been a tough concept to nail down precisely. For example, we have not yet been able to program computers to be innovative - they handle huge, but predictable, rule-based decisions. What drives creative people to transform old ideas into new ones? How can creativity be cultivated or taught? One suggestion is that your environment should include a mix of challenge and involvement, freedom, trust, openness, idea time, playfulness, humor, conflict resolution, idea support, debates and risk taking. Once thought to be a sign of divinity or insanity, we now recognize that creativity is a complex cognitive process, even if the precise process is still unclear.

## The anatomy of creativity

Creativity combines elements of emotion, planning and sensory perception. Furthermore, creative expression can involve linguistic, graphic and/or motor skills as well. Since the frontal lobes control higher order skills, like the planning of a series of actions, the organization of a composition (see our discussion of [executive functions](#) for more detail) as well as motivation and drive to produce, they are necessarily involved in some components of creative thinking. Sensory perception, however, is distributed throughout the brain. Generally, touch is in the parietal lobes, vision in the occipital lobes and hearing, taste and smell are in the temporal lobes. The wide range of creative expression and creative personalities we see reflects the broad involvement of the brain. Individuals vary in their strengths and weaknesses which leads to inherent differences in creativity. Changes in any of these pathways can result in increased, decreased or changed creativity.

## Impact of FTD

*John began to tell friends of his new ability to see not only colors but sounds ... about the same time that he began to have trouble remembering words.*

—Bruce Miller, “A Passion for Painting”

In our clinic at the Memory and Aging Center, we see people who lose certain abilities, like language, while gaining new ones, like musicality and artistic expression. We have met individuals, particularly those with semantic dementia, who never created art before becoming ill and are now making wonderful, intriguing artwork. One explanation for this phenomenon is that healthier parts of the brain compensate for the areas that are no longer working. Therefore, visual expressions such as a drawing, painting or sculpture bloom as the person loses their capability for verbal language.

## Behavioral variant frontotemporal dementia (bvFTD)

bvFTD is associated with atrophy of the prefrontal cortex, anterior cingulate, insula and ventral striatum. When this atrophy is predominantly right-sided, bvFTD is almost always associated with changes in behavioral and emotional function. The changes most commonly associated with bvFTD are apathy, disinhibition (disregard for social convention), aberrant motor behaviors (twitches, ticks, etc.) and eating disorders (specifically increases in appetite and strong preferences for sweets or other particular foods). Other behavioral changes in bvFTD include elation and euphoria (inappropriate or excessive happiness), aggression, irritability, sleep disturbances, depression and

anxiety. Sometimes patients with bvFTD also develop addictive behaviors late in life.

People with bvFTD who develop a creative drive tend to produce simplified, less representational, bizarre, more distorted images with a disordered spatial composition. They also tend to use less variety in the types of marks made to create the artwork (shading, heavy strokes, light lines, etc.). Visual composition involves planning how the piece will look at the end, and the damage to the frontal areas impacts this planning skill. This free style may also reflect the disinhibition and lack of interest in following the rules. The distortions, particularly of the face, may derive from the growing emotional distance from other people. Despite the development of creativity in some patients with bvFTD, apathy and inertia leading to diminished creativity is more typical.

## **Semantic dementia (SD)**

SD results from atrophy of the anterior temporal lobes (including the amygdala), insula, prefrontal cortex and anterior cingulate. Though more commonly thought of as a language disorder, SD is often associated with dramatic changes in behavioral and emotional function. Disinhibition and compulsive behaviors are the most common changes in SD. Other common changes include apathy, eating disorders, sleep disturbances, elation and euphoria, as well as depression, anxiety, irritability and aggression.

The artwork of people with SD is often described as bizarre, distorted and colorful. People with predominantly right-sided SD tend to create highly detailed images that lack overall structure or form while people with left-sided damage tend to create more abstract forms and shapes without much detail. People with right-sided SD tend to show distorted faces and expressions, which probably reflect their particular deficits in recognizing faces and emotions, as well as a loss of meaning for what those things are. The eccentric images may stem from the loss of meaning or context for the units of the composition. The elements themselves become detached from their usual roles, remain incomplete, show no activity or are reduced to merely the visual properties (pure perception without meaning). Interestingly, the content may not show much creativity (most likely due to the loss of meaning), but the visual perception and representation can be highly creative whether it's how something is represented, the perspective taken or the arrangement of the composition. Generally, the paintings are realistic or surrealistic without a significant symbolic or abstract component. The work is approached compulsively, and a painting may be repeated over and over. Patients with SD might also explore transmodal expression, meaning they create visual representations of sound or acoustic representations of color. This type of expression is not the same as "synesthesia" where you might see colors when you hear sounds. Transmodal expression uses deliberate, internal associations.

## **Progressive nonfluent aphasia (PNFA)**

PNFA develops when there is shrinking of the left perisylvian cortex (the area surrounding the deepest fold on the side of the brain - the sylvian fissure), an area of the brain more involved in language than personality. Therefore behavioral, emotional and creative changes are less common or more mild in PNFA.